



**DOUGLAS PARK (HWR-773)
CORRECTIVE ACTION PLAN**

MANUFACTURER'S SPECIFICATIONS

Presented on behalf of:

City of Miami
Capital Improvements and Transportation Program
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Miami, FL 33130

Presented by:

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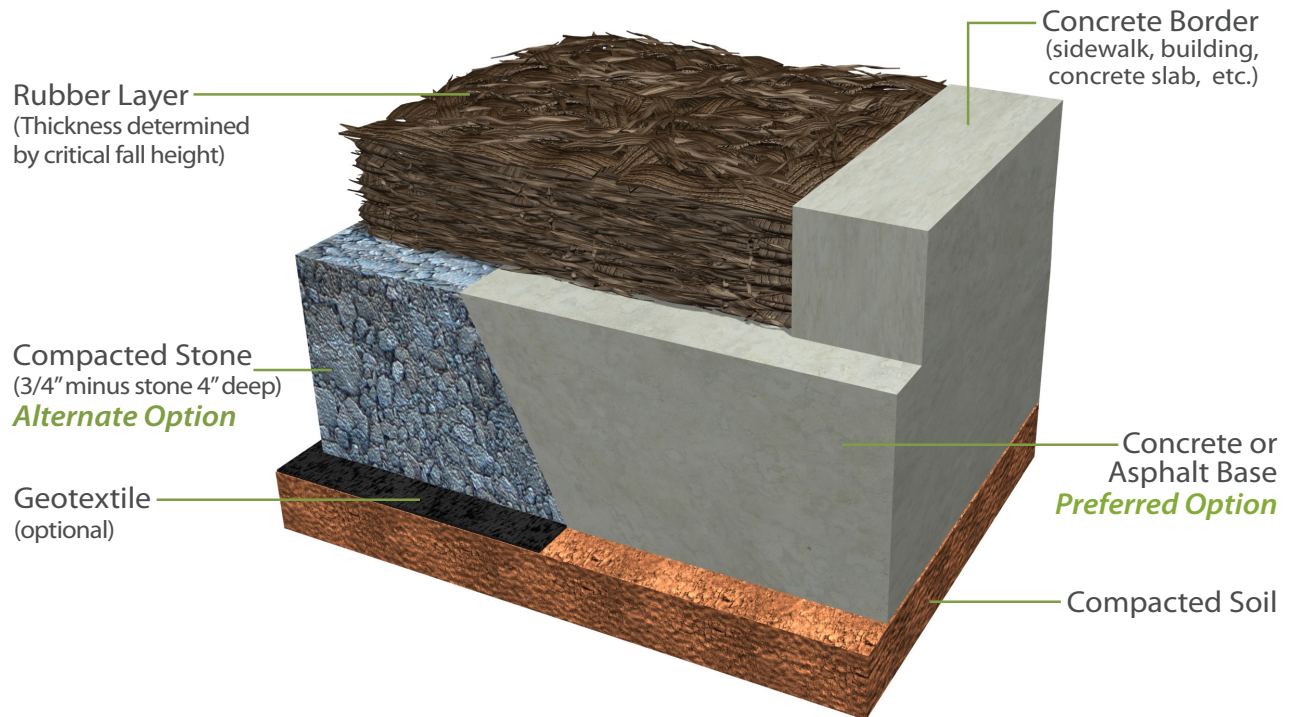
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1.0 XGRASS BONDED RUBBER LANDSCAPE SURFACING



Rubber Surfacing Bonded Rubber



Components are not drawn to scale.



Bonded Rubber Landscape Surfacing Specification

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Single-density, resilient, seamless, bonded rubber, landscape surfacing.

1.2 RELATED DOCUMENTS

- A. Maintenance and Cleaning Instructions
- B. Warranty
- C. Aggregate Subsurface Specification
- D. Concrete Subsurface Requirements
- E. Asphalt Subsurface Requirements

1.3 REFERENCES

- A. US Consumer Product Safety Commission (CPSC) Public Playground Safety Handbook
- B. ASTM F1292-09: Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment
- C. ASTM F1951-09: Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment
- D. ASTM C1028-07: Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.
- E. ASTM E303-93(2008): Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
- F. ASTM D2859: Standard Test Method for Flammability of Finished Textile Floor Covering Materials
- G. ASTM D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers
- H. ASTM D624: Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- I. ASTM D2240: Standard Test Method for Rubber Property - Durometer Hardness
- J. ASTM F1551: Standard Test Methods for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials: Suffix-DIN 18-035, Part 6: Water Permeability of Synthetic Turf Systems and Permeable Bases
- K. ASTM 2047-11: Standard Test Method for Static Coefficient of Friction of Polished Coated Flooring Surfaces ad Measured by the James Machine
- L. The Consumer Product Safety Improvement Act (CPSIA) of 2008
- M. CPSC-CH-E1002-08: Standard Operating Procedure for Determining Total Lead (Pb) in Non-Metal Children's Products
- N. ASTM F963-11: Standard Consumer Safety Specification for Toy Safety
- O. CPSC-CH-C1001-09.3: Standard Operating Procedure for Determination of Phthalates

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specification
- B. Samples: Submit manufacturer's samples of bonded rubber landscape surfacing showing texture, color, and thickness.
- C. IPEMA Certification: Submit IPEMA Certificate of Compliance to ASTM F1292
- D. Manufacturer's Project References:



1. Submit list of successfully completed projects.
 2. Include project name and location, name of owner, and type and quantity of bonded rubber landscape surfacing furnished.
- E. Installer's Project References:
1. Submit list of successfully completed projects.
 2. Include project name and location, name of owner, and type and quantity of bonded rubber landscape surfacing installed.
- F. Maintenance and Cleaning Instructions: Submit manufacturer's maintenance and cleaning instructions.
- G. Warranty: Submit manufacturer's warranty.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
1. Continuously engaged in manufacturing of bonded landscape safety surfacing of similar type to that specified.
 2. Furnished a minimum of 10,000 square feet of bonded rubber landscape surfacing of similar type to that specified within the past 6 months.
- B. Installer's Qualifications:
1. Successful experience in installation of bonded rubber landscape surfacing of similar type to that specified, with a minimum of 10 projects completed within last 6 months.
 2. Employ persons trained for installation of bonded rubber landscape surfacing of similar type to that specified.
 3. Approved by manufacturer.
 4. Covered by Workers Compensation, Automotive and General Liability insurance.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in a dry area at a minimum temperature of 40 degrees F.
- C. Handling: Protect materials during handling and installation to prevent damage or contamination.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Material Temperature: Ensure material temperature is a minimum of 40 degrees F at time of installation.
- B. Air Temperature: Ensure air temperature is a minimum of 40 degrees F for a minimum of 24 hours before, during, and a minimum of 72 hours after installation.
- C. Precipitation: Ensure no prospect of precipitation during and a minimum of 72 hours after installation.

1.8 LIMITATIONS

- A. The following chemicals may cause damage to the bonded rubber landscape surfacing and should be avoided: disinfectants, concentrated chlorine bleach, gasoline, diesel fuel, hydraulic and lubricating oils, acids and organic solvents.
- B. Dissolved minerals and other chemicals such as hydrochlorides from water play areas, pool surrounds and similar applications may cause surface discoloration.



- C. An amber shading may be noticeable when using standard binding agent.
- D. Areas in excess of 1000 square feet or composed of adjacent colors may contain a cold joint or seam due to the nature of the installation process. Large areas or adjacent colors require the material to be installed on separate days.

1.9 WARRANTY

- A. A three (3) year warranty from the date of completion of installation shall be provided against defects in materials and workmanship.

PART 2 - PRODUCT

2.1 MANUFACTURER

- A. XGrass

2.2 BONDED RUBBER LANDSCAPE SURFACING

- A. XGrass Bonded Rubber Landscape Surfacing
 1. Description: Single-density, resilient, seamless, bonded rubber, landscape surfacing.
 2. Compliance: Meet or exceed CPSC guidelines for impact attenuation.
 3. Material: Mixture of colored SBR rubber buffings and 100 percent solids, aromatic, MDI polyurethane binding agent.
 4. Binder to Rubber Ratio: Approximately 18.75 pounds of binder to 100 pounds of rubber.
 5. Total Thickness: From 1 inches to 5 inches
 6. Colors: Standard solid colors include Red, Brown or Green. Standard color combinations include Red/Green/Tan, Red/Brown/Tan or Red/Brown. Standard solid colors and color combinations were chosen based on popularity, UV stability, and cost.
- B. Test Results:
 1. ASTM F1292-09, Gmax < 200, HIC < 1000
 2. ASTM F1951-09, Pass
 3. ASTM C1028-07, Dry > 0.80, Wet > 0.50
 4. ASTM E303-93, Wet BPN average of both directions between 40 and 60
 5. ASTM D2859, Pass
 6. ASTM D412, Average tensile strength > 6 psi, average elongation > 15%
 7. ASTM D624, Average lbs/force at rupture > 6, average thickness > .75", average tear strength > 8 lbs/ force/inch
 8. ASTM D2240, Average change between 4% and 5%
 9. ASTM F1551, > 2000 inches/hour
 10. ASTM 2047-11, Average SCOF > 0.70
 11. CPSC-CH-E1002-08, pass
 12. ASTM F963-11, pass
 13. CPSC-CH-C1001-09.3, pass

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive bonded rubber landscape surfacing. Ensure all applicable site work, including subsurface preparation, fencing, playground equipment installation and all other relevant work, has been completed. Notify owner if areas are not acceptable. Do not begin installation until unacceptable conditions have been corrected.



3.2 PREPARATION

- A. Prepare subsurface in accordance with manufacturer's instructions to ensure proper support and drainage for bonded rubber landscape surfacing. Finished elevations of subsurface shall be as indicated on the Drawings. Finished elevations of adjacent areas/ borders/edging shall be as indicated on the Drawings. Subsurface shall be installed in a true, even plane and sloped to drain unless otherwise indicated on the Drawings.
- B. Aggregate Subsurface: Aggregate subsurface shall be as specified in Section 1.2.
- C. Concrete Subsurface:
 - 1. Concrete subsurface shall be as specified in Section 1.2.
 - 2. Apply light broom finish.
 - 3. Ensure concrete is sound with no cracks or loose material.
 - 4. Ensure concrete is a minimum of 28 days old.
 - 5. Test concrete for moisture in accordance with manufacturer's instructions to ensure it has sufficiently cured and is dry.
 - 6. Power wash existing concrete in accordance with manufacturer's instructions.
- D. Asphalt Subsurface:
 - 1. Asphalt subsurface shall be as specified in Section 1.2.
 - 2. Ensure asphalt is sound with no cracks or loose material.
 - 3. Ensure asphalt is a minimum of 28 days old.
 - 4. Test asphalt for moisture in accordance with manufacturer's instructions to ensure it has sufficiently cured and is dry.
 - 5. Power wash existing asphalt in accordance with manufacturer's instructions.
- E. Variations in Elevation: Repair variations in elevation of completed subsurface greater than plus or minus 1/4 inch over 10 feet in any direction.

3.3 INSTALLATION

- A. Install bonded rubber landscape surfacing in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Ensure prepared subsurface is dry, clean and free of any foreign or loose material.
- C. Install edges in accordance with manufacturer's instructions and as indicated on the Drawings.
- D. Install cold seams as indicated on the Drawings.

3.4 PROTECTION

- A. Owner shall not allow foot traffic on bonded rubber landscape surfacing until a minimum of 80 percent cure is obtained. (Estimated time to obtain 80 percent cure will range from 6 to 72 hours depending on temperature and humidity.)
- B. Owner shall protect completed bonded landscape safety surfacing from damage during installation and cure time.
- C. Owner shall protect completed bonded rubber landscape surfacing from damage from subsequent construction activity.

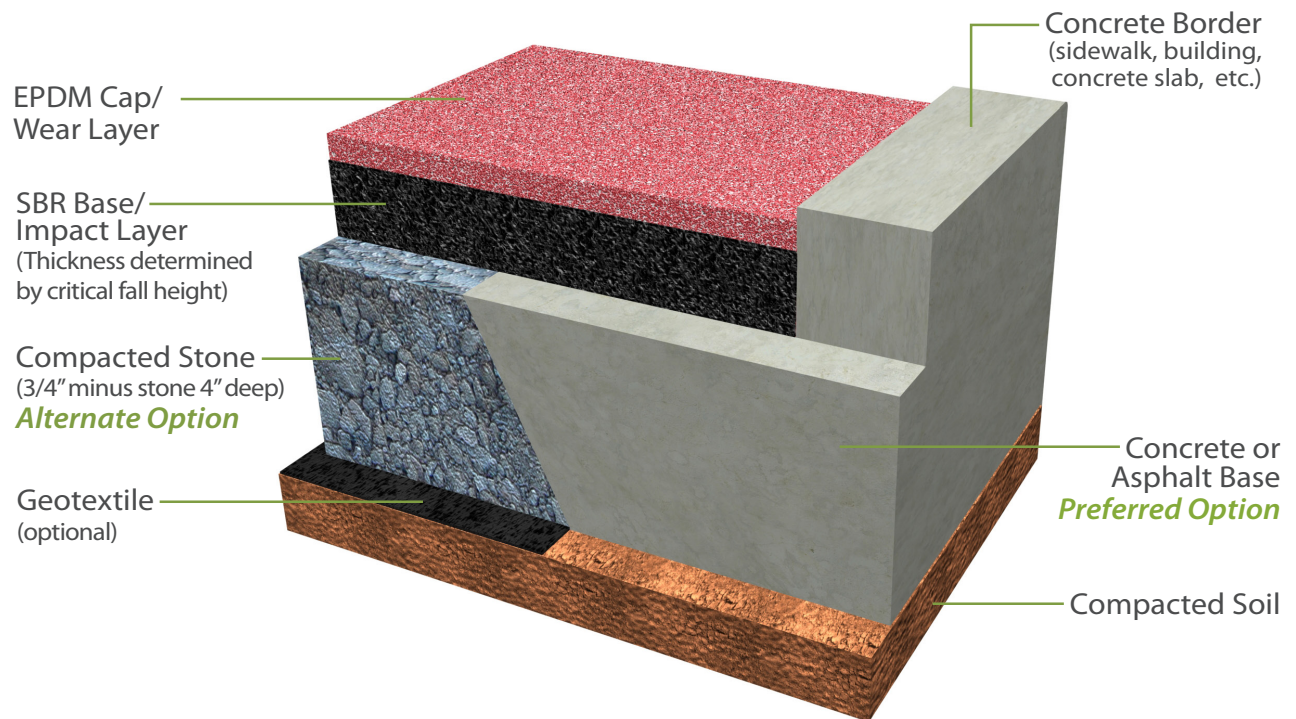
3.5 MAINTENANCE AND CLEANING

- A. Owner should maintain and clean bonded rubber landscape surfacing in accordance with manufacturer's instructions.

2.0 XGRASS POURED-IN-PLACE PLAYGROUND SAFETY SURFACING



Rubber Surfacing Pour-in-Place Rubber



Components are not drawn to scale.



Pour-in-Place Playground Safety Surfacing Specification

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Dual-density, resilient, seamless, pour-in-place, playground safety surfacing.

1.2 RELATED DOCUMENTS

- A. Maintenance and Cleaning Instructions
- B. Warranty
- C. Aggregate Subsurface Specification
- D. Concrete Subsurface Requirements
- E. Asphalt Subsurface Requirements

1.3 REFERENCES

- A. US Consumer Product Safety Commission (CPSC) Public Playground Safety Handbook
- B. ASTM F1292-09: Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment
- C. ASTM F1951-09: Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment
- D. ASTM C1028-07: Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.
- E. ASTM E303-93(2008): Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
- F. ASTM D2859: Standard Test Method for Flammability of Finished Textile Floor Covering Materials
- G. ASTM D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers
- H. ASTM D624: Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- I. ASTM D2240: Standard Test Method for Rubber Property - Durometer Hardness

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specification
- B. Samples: Submit manufacturer's samples of pour-in-place playground safety surfacing showing texture, color, and thickness.
- C. IPEMA Certification: Submit IPEMA Certificate of Compliance to ASTM F1292
- D. Manufacturer's Project References:
 - 1. Submit list of successfully completed projects.
 - 2. Include project name and location, name of owner, and type and quantity of poured-in-place playground safety surfacing furnished.
- E. Installer's Project References:
 - 1. Submit list of successfully completed projects.
 - 2. Include project name and location, name of owner, and type and quantity of poured-in-place playground safety surfacing installed.
- F. Maintenance and Cleaning Instructions: Submit manufacturer's maintenance and cleaning instructions.
- G. Warranty: Submit manufacturer's warranty.



1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Continuously engaged in manufacturing of pour-in-place playground safety surfacing of similar type to that specified.
 - 2. Furnished a minimum of 10,000 square feet of pour-in-place playground safety surfacing of similar type to that specified within the past 6 months.
- B. Installer's Qualifications:
 - 1. Successful experience in installation of pour-in-place playground safety surfacing of similar type to that specified, with a minimum of 10 projects completed within last 6 months.
 - 2. Employ persons trained for installation of pour-in-place playground safety surfacing of similar type to that specified.
 - 3. Approved by manufacturer.
 - 4. Covered by Workers Compensation, Automotive and General Liability insurance.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in a dry area at a minimum temperature of 40 degrees F.
- C. Handling: Protect materials during handling and installation to prevent damage or contamination.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Material Temperature: Ensure material temperature is a minimum of 40 degrees F at time of installation.
- B. Air Temperature: Ensure air temperature is a minimum of 40 degrees F for a minimum of 24 hours before, during, and a minimum of 72 hours after installation.
- C. Precipitation: Ensure no prospect of precipitation during and a minimum of 72 hours after installation.

1.8 LIMITATIONS

- A. The following chemicals may cause damage to the pour-in-place playground safety surfacing and should be avoided: disinfectants, concentrated chlorine bleach, gasoline, diesel fuel, hydraulic and lubricating oils, acids and organic solvents.
- B. Dissolved minerals and other chemicals such as hydrochlorides from water play areas, pool surrounds and similar applications may cause surface discoloration.
- C. An amber shading of the upper wear/cap course may be noticeable when using standard binding agent.
- D. Areas in excess of 1000 square feet or composed of adjacent colors may contain a cold join or seam due to the nature of the installation process. Large areas or adjacent colors require the material to be installed on separate days.

1.9 WARRANTY

- A. A five (5) year warranty from the date of completion of installation shall be provided against defects in materials and workmanship.



PART 2 - PRODUCT

2.1 MANUFACTURER

- A. XGrass

2.2 POUR-IN-PLACE PLAYGROUND SAFETY SURFACING

- A. XGrass Pour-in-Place Playground Safety Surfacing
 1. Description: Dual-density, resilient, seamless, pour-in-place, playground safety surfacing.
 2. Compliance: Meet or exceed CPSC guidelines for impact attenuation.
 3. Material: SBR rubber shreds and EPDM rubber granules mixed with binding agent.
 4. Binding Agent: 100 percent solids, aromatic, MDI polyurethane.
 5. Lower Base/Impact Course: Mixture of black SBR rubber shreds and binding agent.
 - a. Binder to Rubber Ratio: Approximately 15 pounds of binder to 100 pounds of rubber.
 - b. Thickness: Sufficient to meet impact attenuation requirements as determined by designated fall height of playground equipment.
 7. Upper Wear/Cap Course: Mixture of colored and/or black EPDM rubber granules and binding agent.
 - a. Binder to Rubber Ratio: Approximately 20.5 pounds of binder to 100 pounds of rubber.
 - b. Thickness: 0.5 inch, nominal.
 8. Total Thickness: From 1.5 inches to 5 inches as determined by designated fall height of playground equipment.
 9. Colors: Standard color combinations include red, green, blue, beige, grey, eggshell, brown, cocoa brown Custom color combinations, custom solid colors and custom graphics are optional. Standard color combinations were chosen based on popularity, UV stability, and cost.
- B. Test Results:
 1. ASTM F1292-09, Gmax < 200, HIC < 1000
 2. ASTM F1951-09, Pass
 3. ASTM C1028-07, Dry > 0.80, Wet > 0.50
 4. ASTM E303-93, Wet BPN average of both directions between 40 and 60
 5. ASTM D2859, Pass
 6. ASTM D412, Average tensile strength > 60 psi, average elongation > 30%
 7. ASTM D624, Average lbs/force at rupture > 16, average thickness > .5", average tear strength > 28 lbs/force/inch
 8. ASTM D2240, Average change between 4% and 5%

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive pour-in-place playground safety surfacing. Ensure all applicable site work, including subsurface preparation, fencing, playground equipment installation and all other relevant work, has been completed. Notify owner if areas are not acceptable. Do not begin installation until unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Prepare subsurface in accordance with manufacturer's instructions to ensure proper support and drainage for pour-in-place playground safety surfacing. Finished elevations of subsurface shall be as indicated on the Drawings. Finished elevations of adjacent areas/



borders/edging shall be as indicated on the Drawings. Subsurface shall be installed in a true, even plane and sloped to drain unless otherwise indicated on the Drawings.

- B. Aggregate Subsurface: Aggregate subsurface shall be as specified in Section 1.2.
- C. Concrete Subsurface:
 - 1. Concrete subsurface shall be as specified in Section 1.2.
 - 2. Apply light broom finish.
 - 3. Ensure concrete is sound with no cracks or loose material.
 - 4. Ensure concrete is a minimum of 28 days old.
 - 5. Test concrete for moisture in accordance with manufacturer's instructions to ensure it has sufficiently cured and is dry.
 - 6. Power wash existing concrete in accordance with manufacturer's instructions.
- D. Asphalt Subsurface:
 - 1. Asphalt subsurface shall be as specified in Section 1.2.
 - 2. Ensure asphalt is sound with no cracks or loose material.
 - 3. Ensure asphalt is a minimum of 28 days old.
 - 4. Test asphalt for moisture in accordance with manufacturer's instructions to ensure it has sufficiently cured and is dry.
 - 5. Power wash existing asphalt in accordance with manufacturer's instructions.
- E. Variations in Elevation: Repair variations in elevation of completed subsurface greater than plus or minus 1/4 inch over 10 feet in any direction.

3.3 INSTALLATION

- A. Install pour-in-place playground safety surfacing in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Ensure prepared subsurface is dry, clean and free of any foreign or loose material.
- C. Install edges in accordance with manufacturer's instructions and as indicated on the Drawings.
- D. Install cold seams as indicated on the Drawings.

3.4 PROTECTION

- A. Owner shall not allow foot traffic on pour-in-place playground safety surfacing until a minimum of 80 percent cure is obtained. (Estimated time to obtain 80 percent cure will range from 6 to 72 hours depending on temperature and humidity.)
- B. Owner shall protect completed pour-in-place playground safety surfacing from damage during installation and cure time.
- C. Owner shall protect completed pour-in-place playground safety surfacing from damage from subsequent construction activity.

3.5 MAINTENANCE AND CLEANING

- A. Owner should maintain and clean pour-in-place playground safety surfacing in accordance with manufacturer's instructions

3.0 GEOSYNTHETIC CLAY LINER (GCL)

GSE BentoLiner EC Geosynthetic Clay Liner

GSE BentoLiner “EC” is a lightly needle-punched reinforced composite geosynthetic clay liner (GCL) comprised of a uniform layer of granular sodium bentonite encapsulated between a woven and a nonwoven geotextile. The product is intended for use on relatively flat slope surfaces and low load applications where minimal internal shear strength is required.



AT THE CORE:

This composite clay liner is intended for use on relatively flat slope surfaces and low load applications where minimal internal shear strength is required.

Product Specifications

Tested Property	Test Method	Frequency	Value
Geotextile Property			
Cap Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft ²	3.0 oz/yd ² MARV ⁽¹⁾
Carrier Woven, Mass/Unit Area	ASTM D 5261	1/200,000 ft ²	3.1 oz/yd ² MARV
Bentonite Property			
Swell Index	ASTM D 5890	1/100,000 lb	24 ml/2 g min
Moisture Content	ASTM D 4643	1/100,000 lb	12% max
Fluid Loss	ASTM D 5891	1/100,000 lb	18 ml max
Finished GCL Property			
Bentonite, Mass/Unit Area ⁽²⁾	ASTM D 5993	1/40,000 ft ²	0.75 lb/ft ² MARV
Tensile Strength ⁽³⁾	ASTM D 6768	1/40,000 ft ²	30 lb/in MARV
Peel Strength	ASTM D 6496 ASTM D 4632 ⁽⁴⁾	1/40,000 ft ²	1 lb/in MARV 6 lb MARV
Hydraulic Conductivity ⁽⁵⁾	ASTM D 5887	1/Week	5 x 10 ⁻⁹ cm/sec max
Index Flux ⁽⁵⁾	ASTM D 5887	1/Week	1 x 10 ⁻⁸ m ³ /m ² /sec max
Internal Shear Strength ⁽⁶⁾	ASTM D 6243	Periodically	150 psf Typical
TYPICAL ROLL DIMENSIONS			
Width x Length ⁽⁷⁾	Typical	Every Roll	15.5 ft x 150 ft
Area per Roll	Typical	Every Roll	2,325 ft ²
Packaged Weight	Typical	Every Roll	2,600 lb

NOTES:

- ⁽¹⁾Minimum Average Roll Value.
- ⁽²⁾At 0% moisture content.
- ⁽³⁾Tested in machine direction.
- ⁽⁴⁾Modified ASTM D 4632 to use a 4 in wide grip. The maximum peak of five specimens averaged in machine direction.
- ⁽⁵⁾Deaired, deionized water @ 5 psi maximum effective confining stress and 2 psi head pressure.
- ⁽⁶⁾Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf normal stress.
- ⁽⁷⁾Roll widths and lengths have a tolerance of ±1%.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.



[DURABILITY RUNS DEEP] For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.