INSTALLATION GUIDELINES MANUAL

January 2018, Revision 3.0

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HydroTurf®

Advanced Revetment Technology

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1.0 Introduction

HydroTurf® Advanced Revetment Technology is a patented system which is used as a hardened armoring for protection against erosion from hydraulic forces. There are three HydroTurf® Systems. These systems are as follows:

HydroTurf® CS with a Structured Geomembrane is shown in Figure 1. The components of this system are as follows:

- Structured Geomembrane Liner (50-mil HDPE Agru Super Gripnet® Geomembrane)
- Engineered Synthetic Turf
- HydroBinder® Infill
- Penetrating Colloidal Concrete Treatment (PCCT) - Optional for Freeze / Thaw Protection

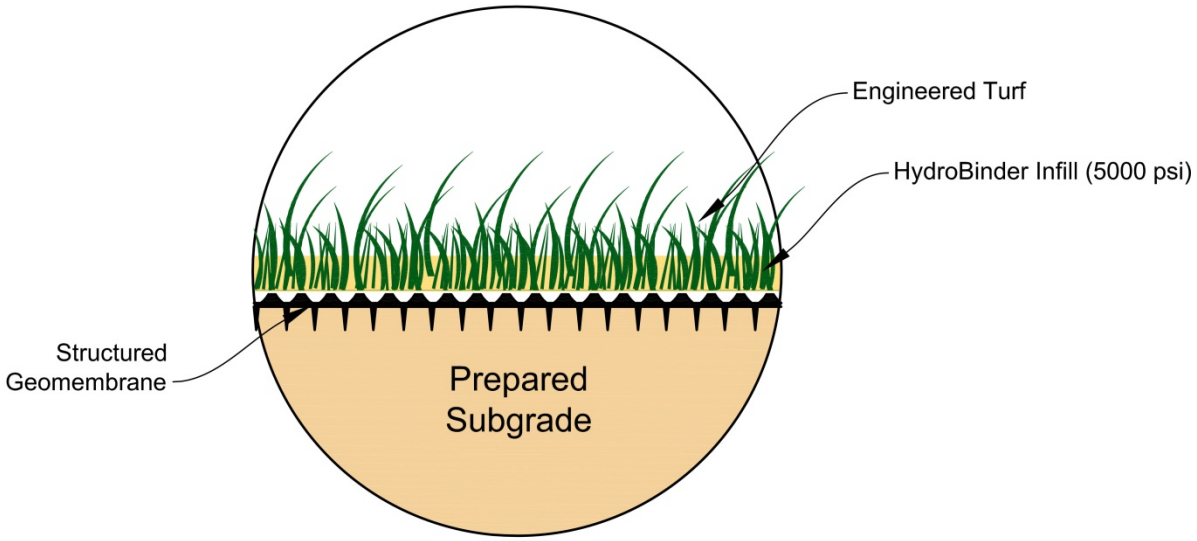

Figure 1 – Section of HydroTurf® CS with Structured Geomembrane

HydroTurf® CS with a Textured Geomembrane is shown in Figure 2. The components of this system are as follows:

- Textured Geomembrane Liner (40-mil HDPE Agru MicroSpike® Geomembrane)
- Engineered Synthetic Turf
- HydroBinder® Infill
- Penetrating Colloidal Concrete Treatment (PCCT) - Optional for Freeze / Thaw Protection

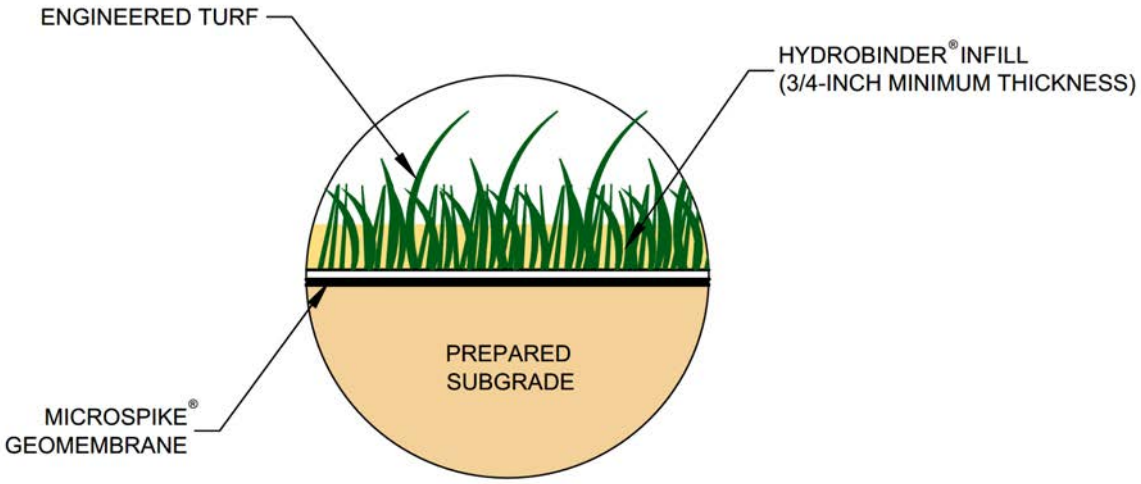

Figure 2 – Section of HydroTurf® CS with Textured Geomembrane

HydroTurf® Z is shown in Figure 3. The components of this system are as follows:

- Engineered Synthetic Turf with Integrated Polyethylene Film Backing
- HydroBinder® Infill
- Penetrating Colloidal Concrete Treatment (PCCT) - Optional for Freeze / Thaw Protection

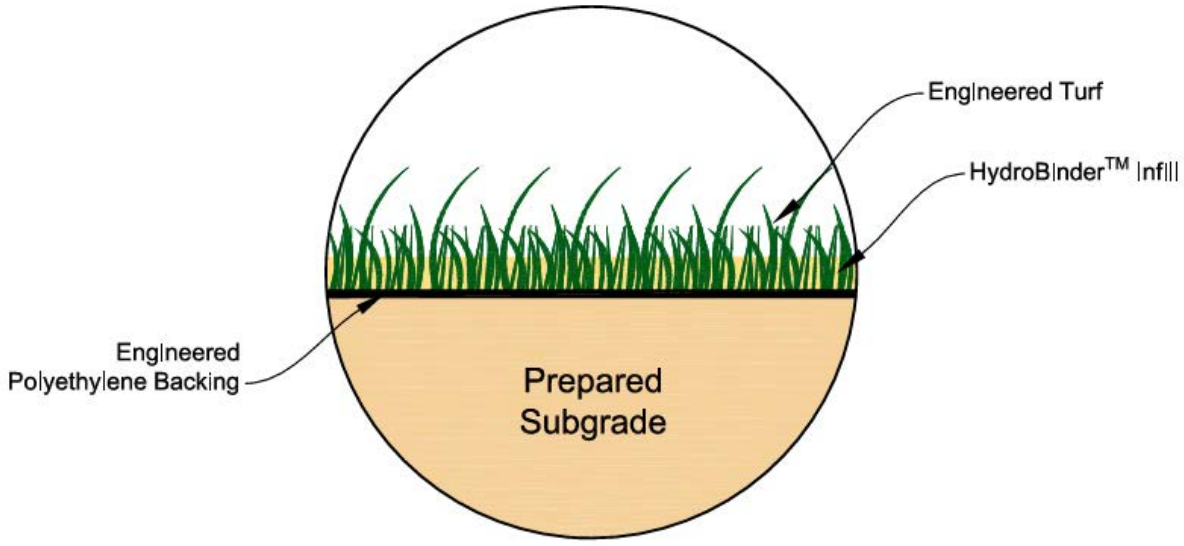

Figure 3 – Section of HydroTurf® Z

2.0 Limitations

This manual is meant as a installation guideline only. Watershed Geosynthetics LLC cannot anticipate the many ways this product may be applied either in design or installation. Varying site conditions will require close coordination between the engineer and the installer to account for site conditions and adjust accordingly. When required by state and/or local regulations, a licensed professional engineer or architect will be required.

HydroTurf® is a U.S. registered trademark which designates a product from Watershed Geosynthetics LLC. This product is the subject of issued U.S. and foreign patents and/or pending U.S. and foreign patent applications. All information, recommendations and suggestions appearing in this literature concerning the use of our products are based upon tests and data believed to be reliable; however, this information should not be used or relied upon for any specific application without independent professional examination and verification of its accuracy, suitability and applicability. Since the actual use by others is beyond our control, no guarantee or warranty of any kind, expressed or implied, is made by Watershed Geosynthetics LLC as to the effects of such use or the results to be obtained, nor does Watershed Geosynthetics LLC assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. Nothing herein is to be construed as permission or as a recommendation to infringe any patent.

3.0 Subgrade Preparation (HydroTurf® CS and Z)

Prior to HydroTurf® system installation, the soil subgrade shall be inspected by the Engineer and geosynthetics contractor. The following shall be observed:

- The soil subgrade shall be compacted to the requirements as specified by the engineer. The subgrade shall be firm and unyielding.
- The soil subgrade shall be smooth and uniform, and shall be substantially free of surface irregularities and protrusions.
- The soil surface shall be free of foreign and organic material, sharp objects, particles or other deleterious material, and shall not contain stones or other objects that could damage any of the HydroTurf® components.
- Maximum particle size (e.g. stones) shall be specified by the design and site-specific specifications.
- The anchor trenches shall be prepared as follows:
  - Anchor trenches shall be excavated to the grades and dimensions as specified on the construction plans. The grades and dimensions shall be confirmed by survey.
  - Anchor trenches shall be straight and uniform with no rough edges.
  - The inside edge of the anchor trench shall be rounded and smooth.
  - Anchor trenches shall be free of sharp objects and other deleterious material.
- Construction stakes and hubs have been removed and the resultant holes have been backfilled.
- Final grades on the slopes as well as benches dimensions and grades conform to the design grades.
- Survey shots and as-built drawings shall be carefully reviewed and evaluated to ensure the surface grades will drain as intended in the design drawings.

4.0 Geomembrane Liner Component (HydroTurf® CS only)

Installation of the Geomembrane HDPE Liner must be completed by an approved geosynthetics contractor who can demonstrate significant experience with installation of geomembranes. Each component of the HydroTurf® system will require specific testing and submittals before, during or after installation of the component. It is the responsibility of the contractor to ensure that each prior component installation has been approved by the owner's representative before continuing with installation of the next HydroTurf® component.

4.1 Geomembrane Panel Deployment

Engineer shall ensure that all Pre-Installation procedures have been followed before proceeding with deployment of geomembrane. As geomembrane component panel deployment proceeds, the Engineer and the Geosynthetics Contractor shall:

- Ensure the geomembrane component is placed in direct and uniform contact with underlying protective cover soil or subgrade soil.
- Observe the geomembrane surface as it is deployed and record panel defects and repair of the defects (e.g. panel rejected, patch installed, etc.) on the repair sheet. Repairs must be made in accordance with the technical specifications and located on a repair drawing.
- Support equipment is not allowed on the geomembrane component during handling unless approved by design engineer.
- Confirm that the surface beneath the geomembrane component has not deteriorated since previous acceptance.
- Confirm that there are no stones, construction debris, soil clogs or other deleterious items on the subgrade that could cause damage to the geomembrane component.
- The geomembrane component shall not be dragged across a surface that could damage the material. If the geomembrane component is dragged across an unprotected surface, it must be inspected for damage and repaired or rejected, as necessary.
- The geomembrane component shall not be deployed during inclement weather conditions as defined in the project specific specifications.
- Personnel working on the geomembrane component shall not smoke, wear boots/shoes that could damage the HydroTurf® system components, or engage in activities that could damage the HydroTurf® system components.
- The method used to deploy the geomembrane shall minimize ripples and eliminate wrinkles but does not cause bridging, and that the geomembrane is anchored to prevent lifting or movement by the wind (geosynthetics contractor is responsible for any damage to or from windblown geomembrane). A wrinkle is a portion of the geomembrane that does not lay relatively flat and is not the result of a subgrade irregularity. A wrinkle is large enough that it can be folded over. A ripple is the result of manufacturing or thermal expansion. It is smaller in nature than a wrinkle and cannot be folded over.
- The geomembrane component shall acclimate to the ambient temperature prior to welding. The ambient temperature is defined as the temperature of previously deployed and welded geomembrane panels. Additional acclimation time will be required when temperatures drop below 50 degrees Fahrenheit and when solar heating is reduced.

- After the panel has acclimated and before seaming operations begin, wrinkles will be worked toward the toe of slope. Excess material can be worked out either by manpower or utilization with equipment to pull excess slack out of the panel.
- The geosynthetics contractor shall apply tension techniques to pull out excess material / slack prior to seaming.
- The horizontal or cross seams on the side slopes shall be staggered so that long horizontal seams across the slope are not produced.

4.2 Geomembrane Field Seaming/Welding

Geomembrane field seaming and welding operations shall be performed as follows:

- Wedge welding machines shall be a low profile machine with a vertical height to not exceed 3 inches to the highest point of the wedge. Installer shall demonstrate that each wedge welding machine meets this requirement.
- The geosynthetics contractor shall have the number of welding apparatuses and spare parts necessary to perform the work.
- Equipment used for welding will not damage any HydroTurf® system components.
- The extrusion welding machine is purged prior to beginning a weld until the heat degraded extrudate is removed.
- The ambient temperature, measured 6 inches above the geomembrane surface, is between 35°F and 104°F, or geomembrane manufacturer's recommended temperature limits if they are more stringent.
- The contact surfaces of the sheets are clean, free of dust, grease, dirt, debris, and moisture prior to welding.
- The weld is substantially free of dust, soil / mud, rocks, and other debris.
- The seams are overlapped a minimum of 3 inches for extrusion and hot wedge welding, or in accordance with geomembrane manufacturer's recommendations, whichever is more stringent.
- Panels shall be overlapped (shingled) in the downgrade direction.
- No solvents or adhesives are present in the seam area.
- The procedure used to temporarily hold the panels together does not damage the panels and does not preclude CQA testing.
- The panels are being welded in accordance with the plans and site specific specifications.
- There is no obvious free moisture in the weld area.
- Observe that at the end of each day or installation segment, unseamed edges are anchored with sandbags or other approved anchoring device.
- Penetration anchors shall not be used to secure the geomembrane.
- Because of wedge welding, "ridges" or "tenting" of the seams may occur. A process called "snapping" must be employed to remove the excess slack caused by the welding process.
- Once two panels have been seamed together or at the approx. 1/3 seaming process a seam "snapping" process should be applied before the seam cools down. This method is performed with manual labor by utilizing 3-4 technicians on the open side of the panel applying a pulling pressure to snap out the tented welded seam.

- Normally, this technique requires several people lined up along the open seam at the edge of the geomembrane and applying clamps to the edge. The panel is then "snapped" into position and when applied properly, the excess slack is removed.
- The snapping technique will be applied while the welding seam is still warm.
- Sand bags along the wedge welded seam will reduce rebound tenting.
- The "snapping" requirement is important in that it allows the engineered turf component to lie more evenly over the geomembrane component.

4.3 Defects

Any portion of the geomembrane with a detected flaw, must be repaired in accordance with the project specifications (e.g., material requirements, installation, testing, etc.).

5.0 Engineered Turf Component (HydroTurf® CS and Z)

The installation of HydroTurf® engineered turf consists of the placement and seaming of the engineered turf component over the structured geomembrane liner (HydroTurf® CS) or over the soil subgrade (HydroTurf® Z).

Box trucks will deliver up to 27 rolls engineered turf per truck. Nine (9) rolls will be strapped together allowing equipment (i.e. pick-up truck, skid steer) to pull the strapped rolls to the front of the truck. Rolls can be moved to a designated area by using a carpet stinger or lifted by straps.

During unloading, the contractor and / or CQA personnel shall confirm that the following is practiced and performed:

- The engineered turf is wrapped in rolls with protective covering.
- The rolls are not stacked more than 3 high.
- The rolls are not damaged during unloading.
- Protect the engineered turf from damage (i.e., mud, soil, dirt, dust, debris, cutting, impact forces, etc.).
- Each roll must be marked or tagged with proper identification.
- Rolls that have been rejected due to damage are to be removed from the site or stored at a location separate from accepted rolls, designated by the Owner/Operator.

5.1 Surface Preparation (HydroTurf® CS)

Prior to installation of Engineered Turf, the following shall be completed:

- The geomembrane component of the HydroTurf® CS has been installed in accordance with the site specific specifications.
- The required geomembrane installation documentation has been completed and approved by the Engineer prior to installation of the Engineered Turf.
- The surface of the geomembrane does not contain soil / mud, stones, debris or large scraps left over from the installation process.

5.2 Engineered Turf Deployment (HydroTurf® CS and Z)

Engineered Turf shall be deployed as follows:

- Observe the engineered turf as it is deployed and record defects and disposition of the defects (panel rejected, patch installed, etc.). Repairs are to be made in accordance with the specifications.
- Equipment used shall not damage the engineered turf, underlying geomembrane or subgrade by handling, trafficking, leakage of hydrocarbons, or by other means.
- Panels shall be deployed such that the seam overlaps are shingled with the flow of water. The panel on the up-flow / upstream side shall have the overlap placed on top of the down-flow / downstream panel.
- The panels shall be deployed in a manner to ensure that the turf filaments are pointing upslope and in the same direction as the adjacent panel.
- The turf shall be ballasted on the open ends to prevent movement by the wind or other means (the contractor is responsible for any resulting damage from insufficient ballast).
- The turf shall remain free of contaminants such as soil / mud, debris, grease, fuel, etc.
- The turf shall be laid smooth and substantially free of tension (but not loose), stress, folds, ripples / wrinkles, or creases. The geomembrane (for HydroTurf® CS) or the turf (for HydroTurf® Z) shall be in intimate contact with the underlying subgrade
- On slopes, the turf shall be secured with sandbag anchoring at the top of the slope and then rolled down the slope.
- On smaller sized HydroTurf Z projects. Anchoring can be temporarily performed using landscape spikes (typically, galvanized 3/8” diameter by 8 to10-in length) and left in place then the anchor trenches backfilled.

5.3 Engineered Turf Seaming - Fusion Seaming Method (HydroTurf® CS and HydroTurf® Z)

Seaming of the engineered turf component of HydroTurf CS and Z may be performed by fusion (heat-bond) welding. This is described as follows:

- Engineered Turf fusion seaming device shall be a DemTech 4-inch, single-wedge welder only (Model No. VM-20/4/A Pro-Wedge Welder 120V, VM20 Outfitted with 100-KIT/4S/VC/A.2 Welding Kit, 4-in, 220V, S.S.).
- Fusion seams require a minimum of 5 inches of overlap.
- Prior to starting the production fusion seaming, trial seams must be performed as outlined in Section 5.3.2.1 below.
- Demonstrate the preparation methods and equipment utilized for removal of the salvage from the outside edge of the rolls of turf (i.e. trimming & cutting devices). Mechanical trimming and cutting devices will be utilized for salvage trimming. Box blades and knives shall not be utilized for salvage preparations. Fraying of geotextile strands when performing the removal of salvage is not acceptable.
- Frayed or loose edges and/or geotextile strands will be cut off or removed.
- Production field seams shall be performed in the same manner as trial seams.

- Any damage and/or burnouts that occur due to production seaming will be repaired as outlined in 5.3.2.2.
- Any damage of the engineered turf shall be patched as outlined in 5.3.2.2.
- All seams not passing the visual inspection shall be repaired as outlined in 5.3.2.2.

5.3.1 Fusion Seaming Method Trial Seam Requirements

Since the temperature and speed controls of the DemTech VM-20 machine are variable and can be increased / decreased depending on weather and environment conditions, the temperature and speed shall be confirmed with a trial seam. This trial seam shall be field tested. Trial seams shall be performed at the being of each day and during the day when the weather (i.e., temperature) conditions change.

1. Prior to turf component welding, CQA personnel shall observe and document the following:
    a. Turf welding apparatus are tested;
        i. at daily start-up; and
        ii. immediately after any break; or
        iii. anytime the machine is turned off for more than 30 minutes.
2. Procedures:
    a. The turf trial weld will be completed under conditions like those under the panels that will be welded.
    b. If at any time, the CQA Personnel believe that an operator or fusion welding apparatus is not functioning properly, a Field Trial Seam Test shall be performed.
    c. Any dispute concerning proper installation techniques or the proper function of fusion welding equipment will be resolved by the OWNER'S REPRESENTATIVE.
    d. The trial weld must be allowed to cool to ambient temperature before seam snapping or panel adjustments are applied.
3. Trial Sample Test Results:
    a. Trial weld samples must comply with "VISUAL PASSING CRITERIA" Visual passing criteria is verified when a manual peel/pull test is performed and the top turf panel tufts transfer to the bottom turf panel. The transfer of approx. 75% of the tufts constitutes a passing trial weld. Also, the trial seam shall be continuous with no gaps.
4. Production Field Seam Test Failure:
    a. Less than approx. 75% of the top turf panel tufts do not transfer to the bottom turf panel.
    b. Production field seams shall be observed to be continuous with no gaps.
5. Additional Trial Sample Testing Requirements:
    a. Two consecutive trial welds meet the visual passing criteria.
    b. The trial weld sample must be a minimum of 3 feet long and 12 inches wide, with the seam centered lengthwise.
    c. If a welding apparatus exceeds 5 hours in the second half of the day, another trial seam must be performed.
6. CQA documentation of trial seam procedures will include the following:
    a. The names of the seaming personnel;
    b. The name of the fusion seaming technician;

c. the welding apparatus number, time, date;
d. ambient air temperature; and
e. welding apparatus temperature & speed setting.

5.3.2 Repairs and Tie-Ins Procedures for Engineered Turf (HydroTurf® CS and Z)

When Repairs, caps and tie-ins of engineered turf are needed, the following shall be performed:

- Repairs to engineered turf shall be completed by using a 4-in overlapped heat-bonded seam.
- All tie-in seams along flatter slope (i.e. 15% or less) with length greater than 25 feet shall use the DemTech VM-20 single wedge welder (outfitted with the synthetic turf welding kit) so a continuous, consistent pressure is achieved throughout the seam.
- A hand-held heat gun (i.e. Leister) with hand pressure should be used in shorter or smaller concentrated areas (i.e., butt seams, caps or patches).
- Hand leistering shall be field tested with a trial seam to confirm proper seaming prior to production seaming. Trial seaming shall be performed in accordance with Section 5.3.2.1.

5.4 Equipment on Engineered Turf (HydroTurf® CS and Z)

During construction, ATV type vehicles and / or rubber tracked skid steer machines will be allowed on flatter slopes for infill placement if their ground pressure is less than 5 psi. No equipment shall be allowed on slopes exceeding 15% without infill in place. Equipment operators shall inspect equipment rubber tires or tracks for sharp protrusions from foreign matter or tire/track damage, embedded rocks, or other foreign materials protruding from tires/track prior to driving on the synthetic turf. Equipment travel paths driven on synthetic turf shall be as straight as possible with no sharp turns, sudden stops or quick starts. Damage caused by having equipment on the engineered synthetic turf (i.e., tears, rips, punctures, wrinkles, ripples, movement, etc.) shall be the responsibility of the installer to repair.

Once construction of the system is complete. No equipment shall be allowed until HydroBinder® Infill is in place and fully cured for 28 days. Post construction and after 28 days of curing of the HydroBinder, drivability tire (ground) pressures on slopes greater than 10% should be limited system to less than 35 psi. Allowable rubber tire or track (ground) pressures on flatter areas may increase to as much as 60 psi as long as sustained traffic load is not expected. Driving should be limited to areas where the subgrade under the HydroTurf® is well-compacted, firm and unyielding.

High traffic areas shall be designed to handle the expected loads.

6.0 HydroBinder® Infill (HydroTurf® CS and Z)

HydroBinder® Infill is a dry, high-strength cementitious mix. It is provided by Watershed Geosynthetics with the HydroTurf system. The HydroBinder® infill is placed dry, groomed into the engineered synthetic turf and hydrated after placement.

When the HydroTurf system is installed and HydroBinder® infill is placed and hydrated, it creates a hardened revetment armoring that can resist the forces from high hydraulic flow velocities.

6.1 Placement of HydroBinder Infill (HydroTurf CS and Z)

HydroBinder® Infill shall be placed as follows:

- HydroBinder® is delivered to the jobsite on pallets in either 3000# bulk bags (1 per pallet) or 80# bags (42 per pallet). It is delivered on a flatbed with 16 pallets (typical) per truckload.
- The HydroBinder® shall be installed into the turf while it is in a dry state.
- Prior to placing the HydroBinder®, the engineered turf shall be dry. If the turf is wet from rain or dew, the installer shall wait until it is dry. The installer may attempt to speed up the drying process by using a blower (i.e., leaf blower, industrial blower, etc.).
- HydroBinder shall not be installed in inclement, wet or rainy weather, or the threat of inclement weather. Also, the HydroBinder® shall not be installed in freezing temperatures.
- The HydroBinder® infill shall be placed at a minimum thickness of ¾-in. This thickness is achieved by placing approximately 6 to 7 lbs/sf of the dry HydroBinder® over the engineered turf.
- The infill is to be placed / spread using a manual drop spreader, top-dresser and/or drop spreader attached to low ground pressure equipment with adequate dust control.
- Manual hand spreading is acceptable when equipment is not practical.
- If weep holes are required for draining the internal drainage layer through the engineered turf (HydroTurf® CS), remove the HydroBinder® in the areas of the weep holes prior to hydration or block the weep hole locations prior to infilling. Blocks may consist of pipe, dowels, etc. Weep holes are typically ½ to ¾-in diameter and are located at the toe of slope on 2-ft centers.

6.2 Brushing of the HydroBinder Infill (HydroTurf® CS and Z)

The HydroBinder® infill will need to be worked into the tufted fibers of the engineered turf such that the turf fibers are in an upright position. This can be achieved as follows:

- The infill shall be worked into the tuft fibers, so the tuft fibers are in an upright position with the infill at a measurable 7/8-inch minimum dry thickness and a ¾-inch minimum finished thickness after hydration and curing. Typically, this is achieved with common mechanical turf broom, power broom, shop broom, yard rakes, and/or greens groomer rakes.
- Brushing of the HydroBinder infill shall be performed such that the fibers of the engineered turf are upright and trapped fibers are minimal. This shall be confirmed by visual inspection. Multiple brushing passes in multiple directions may be required to achieve this.
- Depending on the turf tufted pile height and style (monofilament or slit-tape). The HydroBinder® may need to be placed in 2 to 4 lifts with brushing in between lifts to effectively work the material into the tufts to achieve fibers that are upright.
- Thickness measurements of the HydroBinder® infill shall be taken using a caliper or equivalent device. Measurements shall be taken at a minimum frequency of 5 measurements per 1,000 sf (for smaller projects) or 20 measurements per acre (for larger projects) of installed area.
- The desired HydroBinder® infill thickness shall be achieved prior to the hydration process.

6.3 Hydration of the HydroBinder® Infill (HydroTurf® CS and Z)

The HydroBinder® infill shall be hydrated in place as follows:

- The hydration process shall occur on the same day as the HydroBinder® infill placement.
- The infill shall be hydrated thoroughly with a light and consistent spray of water to avoid displacement of the non-hydrated infill. Estimated application rate is between 0.12 and 0.20 gallons per square foot of area. Hydration rates may vary depending on the geographical location (i.e. low humid areas, dessert air climates, etc.), time of year (i.e., fall, winter, spring or summer), and/or temperature and climate.
- The installer shall not overhydrate the infill so that water begins to runoff and cause loss of cement infill during the process. The general objective is to soak the area to start the hydration process but not to inundate with water beyond saturation of the infill.
- Visual verification can be performed that the HydroBinder® infill has been fully hydrated, and not over hydrated. Visually observe that the top of the HydroBinder has a wet sheen (denoting saturation) but that water is not ponding on top. Also, excavate (with finger or small tool) into the HydroBinder® to confirm full hydration of the section has been achieved.
- To improve curing, the hydrated area may be covered with plastic sheeting.
- The HydroBinder® infill shall harden within 24 hours following hydration, and shall reach its maximum compressive strength at 28 days. If the HydroBinder has not hardened in 24 hours, it may need to be re-hydrated or it may need to be removed and replaced.
- Personnel access on the HydroTurf® shall be prohibited for 24-hr following the hydration of the HydroBinder®.
- Once hydration is completed and the HydroBinder® has set up, backfill and compaction of the anchor trenches may be performed.

6.4 Cold Weather Placement and Curing of the HydroBinder® Infill (HydroTurf® CS and Z)

Cold weather placement and curing techniques for HydroBinder® shall be consistent with industry standard techniques used for concrete and cement products. The following guidelines are suggested:

- Follow the procedures in American Concrete Institute (ACI) 306 – Guide to Cold Weather Concreting.
- Cold weather exists when the air temperature has fallen to, or is expected to fall below 40 degrees F during the protection period.
- The protection period is defined as the time required to prevent concrete from being affected by exposure to cold weather. Protection period for HydroBinder is 72 hours from hydration.
- Ensure that frost or frozen surfaces are thawed with no standing water. At the time of HydroBinder placement, the subgrade and surface of the engineered turf shall be at a temperature of at least 36 degrees F and rising.
- Heated tarps and/or insulated blankets are required to maintain the temperature of the HydroBinder above 55 degrees F for the protection period.

- Heated tarps may dry out the HydroBinder. Do not allow it to dry out. You may need to add moisture and use impermeable covers.

The project design engineer and/or resident engineer shall provide technical specifications and guidance for cold weather concreting based upon your specific project particulars (i.e., geographical location, weather, and time of year), and the engineer should review and approve all proposed installation methods.

6.5 Penetrating Colloidal Concrete Treatment for the HydroBinder® Infill (Optional for HydroTurf® CS and Z)

Penetrating colloidal concrete treatment (PCCT) is an optional liquid application and treatment for the freeze / thaw protection of the HydroBinder® infill. It should be applied to the HydroBinder® when specified. The PCCT shall be applied as follows:

- PCCT shall ideally be stored in a location that is dry and between 35 °F to 100 °F (2 °C to 38 °C) ambient temperature. Optimal storage is at the middle of the temperature range. Protect the PCCT from freezing.
  - The following shall be followed when applying the PCCT:
    - The PCCT product and the HydroBinder® surface shall be at temperature of at least 36 deg F (2 deg C) and rising.
    - Do not apply on frozen substrate or when temperature can fall below 32 °F within 24 hours of application.
    - Ensure that frost or frozen surfaces are thawed with no standing water.
    - Areas of standing water shall be removed prior to application.
    - Do not apply unprotected during periods of high winds.
    - PCCT shall not be applied in inclement, wet or rainy weather, or the threat of inclement weather.
    - Do not apply when substrate is 90°F (32°C) or higher. If surface temperature is higher than 90°F (32°C) then pre-wetting with water is required. Be sure to remove any puddles before applying of SCP.
    - When hot temperature and direct sunlight conditions exist, apply a fine mist spray of water on the surface after application of PCCT.
  - Apply PCCT as soon as the HydroBinder® infill is hard enough to walk on without damage to the surface.
  - Use a 1,500-psi (10.5 MPa) airless sprayer set at a pressure that will not damage the surface [i.e., approximately 400 to 900 psi (2.5 to 6.5 MPa)]. For small projects, a pump sprayer may be used.
  - Hold wand and spray the PCCT 6 inches (15 cm) from the surface of the HydroBinder® at a 90º angle.
  - PCCT must be applied using an overlapping spray pattern of 50% on the previous run.
  - Any area that absorbs product faster than 10 minutes will need to be reapplied until the product no longer absorbs faster than 15 minutes.
  - If PCCT has absorbed thoroughly in the majority of the area, but there is pooling in the low areas, use a broom to spread additional PCCT into the areas already penetrated. Do not allow PCCT to dry in pools. Remove excess PCCT with a damp mop. Apply at a rate of approximately 140 ft^2 per gallon of PCCT. If necessary, spray a second application of PCCT.

- For sloped applications, work from lowest to highest elevation. Very light and repeated spray passes should be made on the same area until the concrete surface no longer accepts PCCT. Move onto next area after achieving “point of rejection”.

7.0 Backfilling of the Anchor Trenches (HydroTurf® CS and Z)

HydroTurf® relies on the anchor trenches to serve as a termination point. Top anchor trenches should be backfilled as quickly as practical after Engineered Turf Component is installed (prior to HydroBinder infill placement).

Vertical anchor trenches as well as anchor trenches along the toe should not be backfilled until the HydroBinder infill is in place. However, backfilling the vertical and toes anchor trench backfilling may be required depending on site specific needs. Anchor trench dimensions will be shown in the design drawings.

Backfilling and/or sand bag loading the bottom and side anchor trenches shall be performed to reduce thermal expansion and contraction.

When utilizing HDPE geomembrane, daily permanent and/or temporary anchoring should be considered due to the nature of HDPE contracting with overnight temperature changes and thermal energy conditions changing to protect the wrinkle management techniques applied from contraction.

Sand bags should also be utilized at the bottom perimeter ditch and benches to manage contracting geomembrane seams. The amount of sand bags will be dependent on temperatures

Backfilling of the anchor trenches for the HydroTurf® CS shall be performed as follows:

- The geomembrane component shall be in intimate contact with the anchor trench inside wall and bottom. Wrinkles, ripples, fish mouths, and/or bunching shall be removed and properly patched.
- The geomembrane shall not extend up the outside wall of the anchor trench. It shall be trimmed short of the outside wall and shall extend a minimum of ¾ of the width of the anchor trench.
- The engineered synthetic turf component shall be in intimate contact with the geomembrane. Wrinkles, ripples, fish mouths, and/or bunching shall be removed and properly patched.
- The engineered synthetic turf shall be trimmed so that it does not extend onto the bottom of the anchor trench. It shall be trimmed just short of the bottom and shall extend a minimum of ¾ of the depth of the anchor trench.
- During filling of the anchor trench with compacted soil or concrete backfill, the contractor shall maintain that the geomembrane is in intimate contact with the trench wall and bottom and that the engineered synthetic turf is in intimate contact with the geomembrane.
- Soil backfill shall be compacted in accordance with the specifications for engineered fill. Vibration of the Concrete backfill should be considered and in accordance with standard industry techniques.

Backfilling of the anchor trenches for the HydroTurf® Z shall be performed as follows:

- The engineered synthetic turf component shall be in intimate contact with the anchor trench inside wall and bottom. Wrinkles, ripples, fish mouths, and/or bunching shall be removed and properly patched.
- The engineered synthetic turf shall not extend up the outside wall of the anchor trench. It shall be trimmed short of the outside wall and shall extend a minimum of ¾ of the width of the anchor trench.
- During filling of the anchor trench with compacted soil or concrete backfill, the contractor shall maintain that the geomembrane is in intimate contact with the trench wall and bottom and that the engineered synthetic turf is in intimate contact with the structured geomembrane.
- Soil backfill shall be compacted in accordance with the specifications for engineered fill. Concrete backfill shall be vibrated in place in accordance with standard industry techniques.

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