

TECHNICAL NOTE

***FREEZE–THAW TESTING OF THE HYDROTURF® ADVANCED
REVTMENT TECHNOLOGY***

HydroTurf® is a unique flexible concrete erosion prevention solution consisting of a high-friction, impermeable geomembrane layer overlain by an engineered synthetic turf. The geomembrane is placed directly on the subgrade soil. It is covered with the engineered turf whose fibers provide reinforcement for the high-strength, cementitious infill (HydroBinder®). This infill is placed dry to a thickness of ¾-inch minimum. After placement, it is then hydrated with a light spray of water.

HydroTurf has been used in areas where freeze-thaw forces are present. When used in these areas, the HydroBinder infill is enhanced with a Penetrating Colloidal Concrete Treatment (PCCT). The HydroBinder with the PCCT has been tested for freeze-thaw in accordance with ASTM C666 - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing. The results are reported as average % loss of HydroBinder infill after a specified number of freeze-thaw cycles. These results are included in Table 1:

Sample	Average % Loss of HydroBinder® Infill per Number of Cycles (ASTM C666)		
	100 Cycles	200 Cycles	300 Cycles
HydroBinder with PCCT	0.2%	2.0%	2.7%

Table 1 – Results of Freeze-Thaw Testing (ASTM C666) on HydroTurf

Pictures of the samples before and after testing are shown in Figures 1 and 2, respectively.

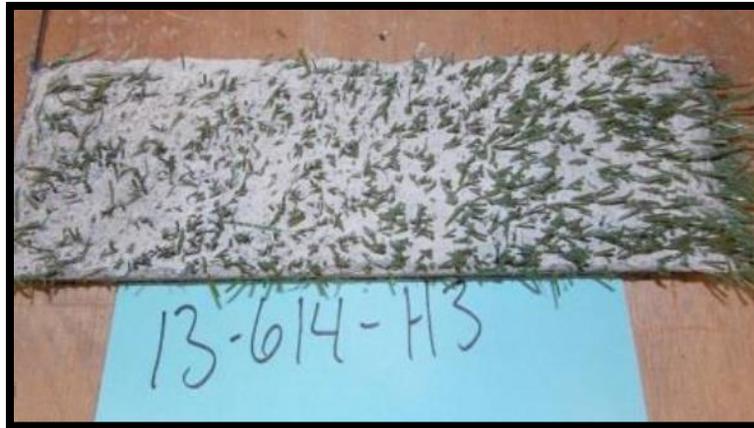


Figure 1 – HydroTurf Sample Prior to Testing

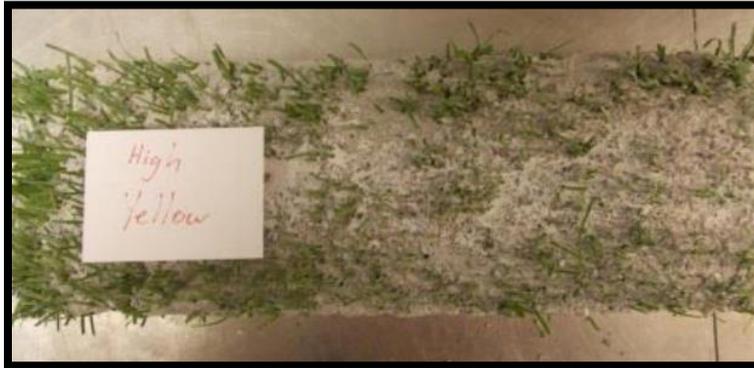


Figure 2 – HydroTurf Sample After Testing

HydroTurf treated with the PCCT performed extremely well. It was noted in the test report that after 300 cycles the samples had “a few small cracks and a little scaling”.

Note that the ASTM C666 test is a very aggressive test for measuring the freeze-thaw properties of concrete. It is significantly more severe than the standard test method to evaluate freeze-thaw for Articulated Concrete Block (ACB) revetments. This test method is ASTM C1262 - Standard Test Method for Evaluating the Freeze-Thaw Durability of Dry-Cast Segmental Retaining Wall Units and Related Concrete Units. The differences in the two standard tests include the following:

- ASTM C666 requires the samples to be fully submerged. For ASTM C1262, one side of the block is submerged in water to 3/8-in (0.95 cm) deep. Only a small portion of the block is subjected to freezing and thawing.

- ASTM C666 has multiple cycles per day (typically 7 or more) while ASTM C1262 has one freeze-thaw cycle per day while. The rapid cycling of ASTM C666 is more destructive.
- ASTM C666 requires 300 cycles while ASTM C1262 typically requires only 100 cycles.

For comparison, typical freeze-thaw specifications for ACBs require that there be no more than 1.0% material loss at 100 cycles in accordance with ASTM C1262. The results of the ASTM C666 show that the HydroBinder infill lost 0.2% at 100 cycles in the more aggressive test. Based on these results, the HydroBinder infill of the HydroTurf will resist freeze-thaw damage significantly better than the typical ACB revetment system.

LIMITATIONS

HydroTurf[®] product (US Patent No. 7,682,105; Canadian Patent No. 2,663,170; and other Patents Pending) and registered trademark are the property of Watershed Geosynthetics LLC. All information, recommendations and suggestions appearing in this letter 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.