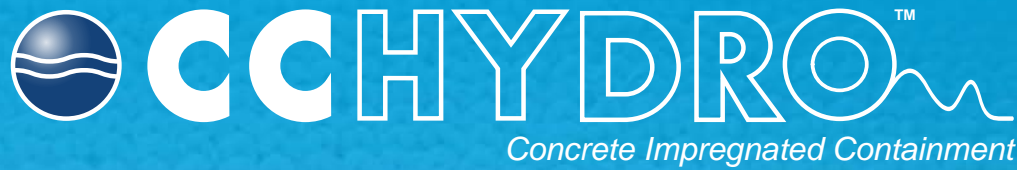




Nuna Innovations Inc.



Concrete Impregnated Containment

PUNCTURE RESISTANCE

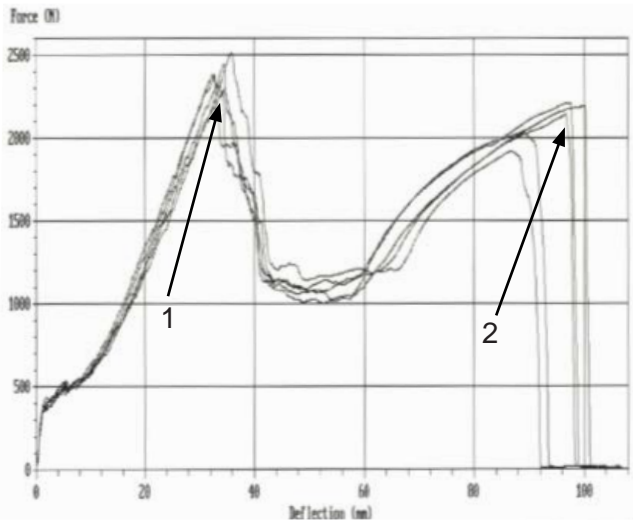
 1.855.815.4385  sales@nunainnovations.com  nunainnovations.com

Puncture Resistance

CC Hydro™ GCCM (Geosynthetic Cementitious Composite Mat) products have been tested for their puncture resistance according to BS ISO 12236:2006 Geosynthetics – Static Puncture Test (CBR test).

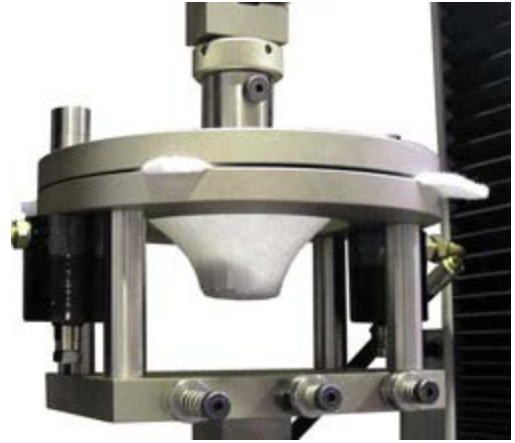
Testing was conducted on five samples of 5mm CC Hydro™ (CCH5™). The material was fitted to the testing rig with the material side facing upwards towards the plunger. A steel plunger (50 mm diameter) is pushed at a constant rate on the centre of the specimen which is clamped between two steel rings. Maximum push-through force and displacement at maximum force are measured.

Summary of Results

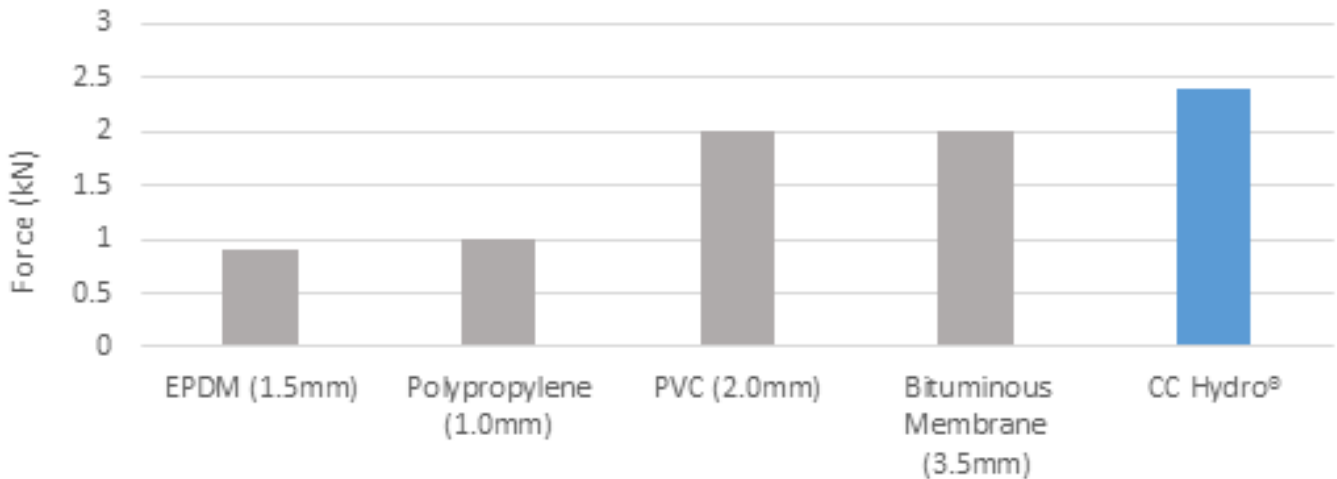


Force vs Deflection for CCH5™. This demonstrates the distinctive bimodal behaviour of the material, where the overlying concrete surface protects the integrated geosynthetic membrane.

1. Protective concrete layer
2. Integrated geosynthetic barrier



	Mean
Max Puncture Force (kN)	2.40
Max Displacement (mm)	94.1



Comparison of published puncture resistance values for a variety of common geosynthetic membranes