Tech Note: Spray-Applied Geomembranes

Polyurea has excellent chemical and temperature resistance properties. As a Spray applied geomembrane polyurea can be modified for hardness, flexibility, chemical or UV resistance making it one of the most diverse geomembrane options available.

Spray-applied Polyurea geomembranes have been successfully used in the construction industry for several years, initially used as a protective truck box lining, they have since expanded their use into geomembrane applications.

A typical installation has polyurea sprayed directly onto a non-woven geotextile substrate; the non-woven geotextile provides the clean working surface for the polyurea to adhere to. Polyurea is a thermosetting material that solidifies rapidly onto the geotextile providing a seamless coating of material across the entire containment. The material is applied by a technician that sprays the coating onto the area manually; the thickness of the material is dependent on the speed of application as well as how many layers the technician puts down. The final material properties may vary slightly due to variables such as different individuals doing the application, or site conditions such as the presence of wind, dust or moisture. The base non-woven geotextile must be laid flat, and be clean and dry to ensure proper adhesion. Another factor to consider is that since polyurea is a thermoset it must be applied at temperatures above freezing to ensure proper cross-linking and hardening.

An advantage of spray-applied geomembranes is their ability to ensure the entire area has been covered. In tight areas it is often difficult to cut, splice and weld prefabricated geomembranes, or to test them to ensure containment will be provided should they be called into duty. A visual inspection of a spray-applied geomembrane is used to determine whether or not an area has indeed been covered; however it is difficult to quantify the final thickness of the polyurea in any given area of the geomembrane and may fluctuate given installation conditions.

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More traditional geomembrane materials such as HDPE and LLDPE are manufactured in a variety of thicknesses from 40 to 60 mil and are available with full QC documentation substantiating their thickness and physical properties.

The excellent chemical resistance of polyurea often allows its use when most other geomembranes would not be suitable. Polyurea, being a thermosetting material, inherently has superior high temperature performance and is not softened by elevated temperatures. HDPE and LLDPE are typically not suitable for applications with service temperatures above 70°C, however, in these applications the use of insulated concrete under the storage tank can often mitigate this situation. (See Foundation Ring Tech note).

While spray applied polyurea has its advantages, these do not come without a cost. The material itself, pound for pound is an expensive material. The application of the material can be a slow and tedious process, dependant on weather conditions and affected by the Applicator or the equipment. When compared to more traditional geomembranes, spray-applied polyurea often comes in at 5 to 10 times the unit rate cost of LLDPE or HDPE when installed in the same thickness.

In containment applications that involve complex detail work, containment of high temperature or aggressive chemicals, spray-applied polyurea may be your only option. Spray applied polyurea can be modified for hardness, flexibility, chemical or UV resistance making it one of the most diverse geomembrane options available.

Contain Enviro Services has over 15 years of primary and secondary containment experience and can help guide you through the process. Contain Enviro Services Ltd. will suggest the most cost-effective containment solution while still meeting the timing, environmental and safety requirements of your project.

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