

GCL COMPATIBILITY WITH LIVESTOCK WASTE

In the livestock industry, waste impoundments are used to collect liquid and solid wastes from the livestock. The waste impoundment liner system must be designed to minimize percolation of the leachate and to meet regulatory requirements for groundwater protection. For any liner to perform as designed it must be chemically compatible with the contact solution.

CETCO has contracted an internationally recognized consulting firm to conduct compatibility testing of Claymax® a laminated geosynthetic clay liner (GCL) with a livestock waste. The laminated Claymax GCL incorporated a thin polyethylene membrane. A flexible wall permeameter test was performed with the laminated GCL sample. The industry standard for permeability testing with a leachate is to run a minimum of 2 pore volumes through the sample. The sample ran for four pore volumes and had a hydraulic conductivity of less than 4.8×10^{-10} cm/sec at a confining pressure of 5 psi. This is comparable to CETCO's composite laminated (CL) GCL specification for hydraulic conductivity of 5×10^{-10} cm/sec at 5 psi confining pressure.

Thus, based upon independent laboratory data, CETCO composite laminated (CL) GCLs are compatible with livestock waste.

5 June 1997

Mr. James T. Olsta, P.E.
Colloid Environmental Technologies Company
1350 West Shure Drive
Arlington Heights, Illinois 60004-1440

Subject: Final Report - Laboratory Test Results
Livestock Waste Storage Pond GCL Testing

Dear Mr. Olsta:

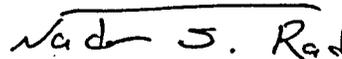
GeoSyntec Consultants (GeoSyntec), Atlanta, Georgia, is pleased to present the attached final test results (Table 1) for the above referenced project. Attachment A presents the general information pertinent to the testing program, and the policy of GeoSyntec regarding the limitations and the use of the test results.

GeoSyntec appreciates the opportunity to provide testing services for this project. Should you have any questions regarding the attached test results or if you require additional information, please do not hesitate to contact either of the undersigned.

Sincerely,



Cuneyt Gokmen, E.I.T.
Assistant Program Manager
Environmental Testing



Nader S. Rad, Ph.D., P.E.
Laboratory Director

Attachment

GLG0248/GEL97094

Corporate Office:
621 N.W. 53rd Street • Suite 650
Boca Raton, Florida 33487 • USA
Tel. (561) 995-0900 • Fax (561) 995-0925

Regional Offices:
Atlanta, GA • Boca Raton, FL • Chicago, IL
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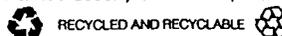


TABLE 1

HYDRAULIC CONDUCTIVITY TEST RESULTS
 COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY
 LIVESTOCK WASTE STORAGE POND GCL TESTING

Client Sample ID	Lab Sample No.		Hydraulic Conductivity ASTM D 5887					Remarks	
	Permeant	Geosynthetic Clay Liner	Test Specimen Initial Conditions Moisture Content (%)	Consol. Pressure (psi)	Pore Volume (-)	Elapsed Time (hr)	Final ⁽¹⁾ Hydraulic Conductivity (cm/s)		Index Flux q_i [(m ³ /m ²)/s]
600SP	Livestock Waste Leachate	97D02	47.4	5	4.0	809.3	4.8E-10	8.7E-10	Note 2

Notes:

1. The final hydraulic conductivity value is based on the average of the last four readings.
2. The test specimen was hydrated/saturated/consolidated for 48 hours with the permeant, then permeated with the same permeant.