



Standard Guide for Storage and Handling of Geosynthetic Clay Liners¹

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1. Scope

1.1 This guide covers guidelines for the proper storage and handling of geosynthetic clay liners received at the job site by the end user.

1.2 This guide contains general guidelines and is not intended to replace project-specific requirements as found in the contract drawings or specifications. In the event of a conflict, the requirements of the project specifications will supersede the requirements of this practice.

1.3 The values given in SI units are to be regarded as the standard. The inch-pound units given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 4354 Practice for Sampling of Geosynthetics for Testing²

D 4439 Terminology for Geosynthetics²

D 4873 Guide for Identification, Storage, and Handling of Geotextiles²

3. Terminology

3.1 Definitions:

3.1.1 *core pipe, n*—a rigid pipe or rod inserted through the core of a GCL roll. Each end of the pipe is connected to a chain or lifting strap which attaches to equipment for GCL unloading, on-site handling, and installation.

3.1.2 *geosynthetic clay liner (GCL), n*—a manufactured hydraulic barrier consisting of clay bonded to a layer or layers of geosynthetics.

3.1.3 *spreader bar, n*—a steel beam used in conjunction with the core pipe that prevents the lifting chains or straps from chafing against the ends of the GCL roll.

3.1.4 *stinger, n*—a rigid pipe or rod with one end directly connected to a forklift or other equipment. The opposite end of the stinger can then be inserted through the GCL roll core such

that the equipment is able to unload, handle, or install the GCL.

3.1.5 For definitions of other geosynthetic terms used in this practice, refer to Terminology D 4439.

4. Significance and Use

4.1 For optimum performance, GCLs must be stored and handled prior to their installation in a manner that does not impact their physical properties. Adherence to these storage and handling guidelines will help to ensure that acceptable GCL performance will be achieved.

5. Procedure

5.1 Receiving and Handling GCL at the Job Site:

5.1.1 The GCLs are packaged in individual rolls and are typically delivered to the job site in trucks. Each roll is individually wrapped and labeled by the GCL manufacturer. Prior to unloading the rolls, make a visual examination of the shipment in order to identify any damage that may have occurred in transit to the site. Record and report any immediately visible or suspected damage to the GCL rolls immediately to the GCL carrier and to the supplier. Tag, mark, and segregate damaged rolls.

5.1.2 Unloading the rolls from the delivery vehicle must be done in manner that prevents damage to the GCL and its packaging.

NOTE 1—A pipe or solid bar of sufficient strength to support the full weight of the GCL roll without significant bending should be used for all unloading and handling activities. The diameter of the pipe should be small enough to be easily inserted through the core of the GCL. High-strength straps or chains should link the ends of the core pipe to the ends of the spreader bar facilitate lifting the roll with a backhoe or other equipment. Care must be taken to ensure that the lifting straps/chains do not rub against the GCL.

5.1.2.1 Alternately, the GCL may be unloaded and handled using a “stinger” bar protruding from the front end of a forklift or other equipment. The stinger should be at least three fourths the length of the core and also must be capable of supporting the full weight of the GCL without significant bending.

5.1.2.2 If recommended by the manufacturer, a sling handling method utilizing appropriate loading straps can be used.

5.1.3 Under no circumstances should the GCL rolls be dragged, lifted by one end, pushed to the ground from the delivery vehicle, or otherwise unloaded in a fashion that could damage the GCL.

5.1.4 Immediately repair any tears in the packaging discovered during unloading activities using tape and plastic sheeting

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² *Annual Book of ASTM Standards*, Vol 04.09.

as necessary to restore a waterproof protective barrier around the GCL. Examine the GCL itself for damage wherever torn packaging is observed.

5.2 *Storing the GCL at the Job Site:*

5.2.1 Store GCL rolls in their original, unopened packaging in a location away from construction traffic but sufficiently close to the active work area to minimize handling. The designated storage area should be level, dry, well-drained, stable, and should protect the GCL from:

5.2.1.1 Precipitation,

5.2.1.2 Standing water,

5.2.1.3 Ultraviolet radiation,

5.2.1.4 Chemicals,

5.2.1.5 Open flames and welding sparks,

5.2.1.6 Temperatures in excess of 71°C (160°F),

5.2.1.7 Vandalism, animals, and

5.2.1.8 Any other environmental condition that could impact the physical properties of the GCL.

5.2.2 To facilitate the installation process, store the GCL such that it is protected from freezing.

5.2.3 Always store GCL rolls lying flat, continuously supported, and never standing on one end. Avoid storage of the rolls on blocks or pallets so as to eliminate the possibility that localized contact points could cause product thinning. The rolls may be stacked upon one another, provided they are placed in a manner that prevents them from sliding or rolling from the stack. The recommended stack height is three rolls. The height of the stack should be limited to that at which safe access is provided to equipment and laborers, and at which roll cores at the bottom of the stack are not distorted or crushed.

5.2.4 If the integrity of the GCL packaging has not been affected during the shipping and unloading processes, and if the storage requirements listed herein are achieved, then the rolls may be stored on site with a waterproof tarpaulin or plastic sheet placed over the GCL stockpile. Enclosed indoor storage is preferred if the GCL rolls are to be stored for the long term.

6. Keywords

6.1 GCL; geosynthetic clay liner; handling; storage

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