

Geosynthetic Institute

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Original: August 7, 2017
Revision 1: November 22, 2017
Revision 2: July 22, 2019

GRI Standard GS16*

Standard Guide for

Geosynthetic Sampling for Subsequent Laboratory Conformance Testing

This guide was developed by the Geosynthetic Research Institute (GRI), with the cooperation of the member organizations for general use by the public. It is completely optional in this regard and can be superseded by other existing or new test methods on the subject matter in whole or in part. Neither GRI, the Geosynthetic Institute, nor any of its related institutes, warrant or indemnifies any projects developed according to this test method either at this time or in the future.

1. Scope

- 1.1 This guide provides a means by which samples of geosynthetics should be obtained from rolls of material to preserve sample integrity during shipment and handling prior to conformance testing in an accredited laboratory. This practice gives instructions on taking samples from which specific test specimens are obtained.
- 1.2 This guide does not provide a procedure for providing a statistically valid sample. That practice is covered in ASTM D4354 “Standard Practice for Sampling of Geosynthetics and Rolled Erosion Control Products (RECPs) for Testing”.
- 1.3 This guide assumes that the reader understands the definitions of lot, roll, sample, coupon, specimen and test results per ASTM D4439 “Terminology for Geosynthetics.”
- 1.4 Conformance tests serve CQC personal to see if the proper material was shipped to the job site and CQA personnel to see if the material meets the project specification.

*This GRI standard is developed by the Geosynthetic Research Institute through consultation and review by the member organizations. This guide will be reviewed on an as-required basis. In this regard it is subject to change at any time. The most recent revision date is the effective version.

2. Referenced Documents

2.1 ASTM Standards

D4354 Standard Practice for Sampling of Geosynthetics and Rolled Erosion Control Products for Testing

D4439 Standard Terminology for Geosynthetics

3. Terminology

3.1 Geosynthetic, n – a planar product manufactured from polymeric material used with soil, rock, earth, or other geotechnical engineering related material as an integral part of a man-made project, structure, or system.

3.2 Conformance tests - a set of standardized tests used to determine if a shipment of geosynthetics conforms to the product ordered and to an agreed upon specification for a particular job or project.

Note 1: Conformance tests are usually a subset of a complete specification consisting of the more straightforward and basic physical properties (e.g., length, width, thickness, mass per unit area), and/or common mechanical tests (e.g., tensile, tear, puncture, etc.).

Note 2: The precise tests and their referenced designations are set by the CQA organization often in conjunction with the project's design engineer.

3.3 Construction Quality Control (CQC) - A planned system of inspections that are used to directly monitor and control the quality of a construction project. Construction quality control is normally performed by the geosynthetics installer and is necessary to achieve quality in the constructed or installed system. Construction quality control (CQC) refers to measures taken by the installer or contractor to determine compliance with the requirements for materials and workmanship as stated in the plans and specifications for the project.

3.4 Construction Quality Assurance (CQA) - A planned system of activities that provides the owner and permitting agency assurance that the facility was constructed as specified in the design. Construction quality assurance includes inspections, verification, audits, and evaluations of materials and workmanship necessary to determine and document the quality of the constructed facility. Construction quality assurance (CQA) refers to measures taken by the CQA organization to determine if the installer or contractor is in compliance with the plans and specifications of a project.

4. Significance and Use

This guide is necessary to in order to see that the proper protocol is used in the field or at a manufacturer's facility so as to have representative geosynthetic material for use in the

testing laboratory. Specific test specimens are taken directly from the samples submitted as called out in the sampling protocol for each test method.

- 4.1 This guide provides a means by which samples of geosynthetics should be obtained to preserve sample integrity during sampling, shipment and handling prior to conformance testing in an accredited laboratory. This guide gives instructions on taking samples from which test specimens are obtained.
- 4.2 This guide does not provide a procedure for providing statistically valid sample. That practice is covered in ASTM D4354 “Standard Practice for Sampling of Geosynthetics and Rolled Erosion Control Products (RECPs) for Testing”.
- 4.3 This guide assumes that the reader understands the definitions of lot, roll, sample, coupon, specimen and test result per ASTM D4439 “Terminology for Geosynthetics”.
- 4.4 This guide should introduce the applicable requirements set forth in the EPA/600/R-93/182, “Quality Assurance and Quality Control for Waste Containment Facilities” document that pertains to the responsibilities of CQA/MQA -- with emphasis on MQA sampling.
- 4.5 If dictated by CQA/MQA entities/contracts, the below protocols apply. Other initiating parties may not be essentially governed by this guide but can utilize it as a reference.

Note 3: Test specimens will be cut from the sample that is sent to the testing laboratory. These specimens will generate conformance test results which will be compared to a specification. If the sample is not representative of the product in question, the whole exercise has been compromised from the start. *In short, this is a very important task. It must be done right the first time!*

5. Health and Safety

- 5.1 It is important to recognize that there are health and safety hazards associated with cutting geosynthetic materials. A sharp box cutter (or similar instrument) is typically used to conduct this task. Dull blades can lead to unwanted safety hazards. Use of a new sharp blades are recommended.
- 5.2 Always wear a Kevlar glove on the free hand while cutting. This will greatly reduce the risk of a cutting injury while sampling.
- 5.3 Note that geosynthetic rolls are heavy and cumbersome. At the minimum, this is a two person operation.

6. Sampling Procedure

- When cutting a sample from a roll, do not sample the first 1.0 m (3.0 ft.) or the last 1.0 (3.0 ft.) of the roll. As such, the samples shall not include the outer or inner wrap of the roll. This step means that there will be waste that has to be disposed of properly. For large diameter rolls, the 1.0 (3.0 ft.) scrap length may not be enough. In all cases pristine material should be uncovered and sampled. Do not sample material damaged by shipping and handling. Be prepared to properly manage the wrapper and scrap material.
- The length and width of the sample shall yield a minimum area of 3.3 m² (36 ft²) for each sample. For rolls, less than 3.7 m (12 ft.) wide, one will have to take a length of sample longer than 1.0 m (3.0 ft.).
- The sample with a unique identification shall be obtained from a single roll of material.
- The product roll should be randomly selected from which the sample will be taken per ASTM D4354. The process should be overseen by CQA representatives.
- The CQA organization may ask for a split sample for side by side testing.
- In addition, it should be noted that for critical jobs, two samples may be sent to a designated laboratory - one for primary testing and one for re-testing if needed.
- Obtain a sample extending the width of the roll and at least 1.0 (3.0 ft) in length.
- Samples shall be taken without joints or seams.
- There should be no folds or wrinkles in the sample.
- Avoid stretching or deforming the sample while cutting, handling and shipping.
- Sampling should be conducted whenever possible with the assistance of a forklift with a “stinger” pole attachment. The sample is removed from the roll as it is held aloft by the forklift. Alternatively, sampling should be conducted on a flat, dry and smooth surface. This is best done at the manufacturing facility or distribution center.
- It is recognized that individual rolls may be cut to pre-selected widths prior to delivery to some projects. Each of these cut portions should be labeled in a manner that allows identification of its original position within the previous full-width roll. It should be clearly stated that the original full-width rolls should be tested and not the portions cut from those rolls. Original, full width rolls should be made readily accessible for sampling by the manufacturer.

Note 4: It should be clearly stated that “when” the conformance samples are taken will impact the project. The major difference is between in-plant sampling during manufacture versus requesting conformance sampling from randomly selected rolls after the entire order has been produced. The latter, requires significant additional cost due to having to dig rolls out of storage piles, cut bands, cut sample, re-band and add back to the storage yard. In addition to time and energy, there is a real chance of handling damage of the roll goods during this retrieval process. Proper conformance sampling protocol is best done by an owners representative during production as the material is being made. Such sampling requires planning and good communication. However, it will save significant time, effort and money.

7. Sample Information

- Samples shall have the following information physically attached to each sample via a label or alternatively, this information may be written directly on the sample.

SAMPLE:

LAB NAME _____

ADDRESS _____

PHONE # _____ EMAIL _____

MANUFACTURER _____ PRODUCT STYLE _____

ROLL NO. _____ LOT/BATCH NO. _____ WHERE SAMPLED _____

SAMPLED BY _____ DATE SAMPLED _____ DATE SHIPPED _____

- In addition to the information above, the sampler should assign a unique number to identify the sample (whether provided or created). That may not be necessary in all cases.
- Machine direction shall be marked on each sample. This should be clearly marked along the outer edge of the sample with an “MD” (machine direction) and an arrow.
- The sample shall be rolled for shipment to the accredited laboratory-testing facility. It shall be placed inside, or around, a rigid core during shipment.
- The package shall be wrapped with a protective cover to prevent damage during shipping and handling.
- If sample rolling is not possible, at the discretion of the manufacturer, the sample may be loosely folded and boxed for shipment to preserve sample integrity.
- Samples should be shipped within a month of sampling unless agreed upon by the manufacture.
- Packed samples should be stored in a cool dry place if not shipped immediately.
- All samples should be shipped with a bill-of-lading for the purpose of tracking and traceability. (A.K.A. chain-of-custody must be maintained)
- Sample should be shipped with a letter of transmittal instructing the lab which tests to perform. An example of which is attached to this document as Appendix “A”.

Revision Schedule

August 7, 2017	Original
November 22, 2017	Revision 1 - Added Sample Submittal Form
July 22, 2019	Revision 2 - Added Note 4



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APPENDIX "A"

Sample Submittal Form

Project Reference: (GSI use only.)

Please Fill Out All Applicable Items:

Company _____	Date Submitted _____
Contact _____	GSI Contact _____
Address _____	Turnaround Time Requested Surcharge
_____	• Standard (2 weeks or less) _____ None
Phone _____ Fax _____	• Rush (3-5 work days) _____ 50%
Email _____	• Emergency Rush (1-2 work days) _____ 100%
Invoice Address (if different from above) _____	*Rush requires Project Manager approval. Please call (610) 522-8440
Method of Payment: <input type="checkbox"/> PO# _____	<input type="checkbox"/> Check # _____ <input type="checkbox"/> Credit Card

Storage Requirements (place X on line): _____ Room Temp. _____ Refrigerate _____ Required Endurance

Special Handling Instructions (place X on lines that apply): N/A _____ Controlled Substance _____ Hazardous (include MSDS)

Other _____

Special Testing Instructions: _____

NOTE 1: All results are sent via email unless otherwise requested by client.
 NOTE 2: Sample skeleton retained for only 30 days unless otherwise requested by client.
 NOTE 3: Spent specimens are not retained after testing unless otherwise requested by client.

Sample Type (ex. Geotextile, geomembrane, GCL, seam, soil, water)	Client Sample ID / Name	Total # of Containers	Test Requested	Expected specimen prep

Relinquished By (signature):	Date:	Received By (signature):	Date:	Comments:

Fill Out When Returning Samples to Client

Relinquished By (signature):	Date:	Received By (signature):	Date:	Comments: