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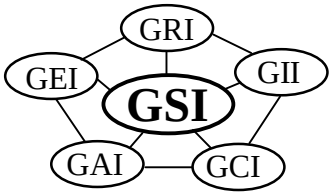

Rev. 1: 6/23/03
Revision Schedule on pg. 8

GRI Test Method GM18*

Standard Specification for

"Test Properties, Testing Frequency and Recommended Warrant for Flexible Polypropylene (fPP and fPP-R) Nonreinforced and Reinforced Geomembranes"

1. Scope

1.1 This specification covers flexible polypropylene geomembranes which are nonreinforced (fPP) in thickness of 30 mils (0.75 mm) and 40 mils (1.00 mm) and also scrim reinforced (fPP-R) in thicknesses of 36 mils (0.91 mm) and 45 mils (1.14 mm).

1.2 This specification sets forth a set of minimum average or maximum average physical, mechanical and endurance properties that must be met by the geomembrane being manufactured.

1.3 In the context of quality systems and management, this specification represents manufacturing quality control (MQC).

Note 1: Manufacturing quality control represents those actions taken by a manufacturer to ensure that the product represents the stated objective and properties set forth in this specification.

*This GRI standard is developed by the Geosynthetic Research Institute through consultation and review by the member organizations. This specification will be reviewed at least every 2-years, or 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.

1.4 This standard specification is intended to ensure good quality and performance of fPP and fPP-R geomembranes in general applications, but may not be adequate for the complete specification of a specific situation. Additional tests, or more restrictive values for the tests indicated, may be necessary under conditions of a particular application.

1.5 This specification also presents a recommended warrant which is focused on the geomembrane material itself.

1.6 The recommended warrant attached to this specification does not cover installation considerations which is independent of the manufacturing of the geomembrane.

Note 2: For information on installation techniques, users of this standard are referred to the geosynthetics literature, which is abundant on the subject.

2. Referenced Documents

2.1 ASTM Standards

D 751 Test Methods for Coated Fabrics
D 1603 Test Method for Carbon Black in Olefin Plastics
D 2136 Test Method for Coated Fabrics – Low Temperature Bend Test
D 3895 Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry
D 4329 Practice for Operating Light and Water Apparatus (Fluorescent UV Condensation Type) for Exposure of Plastics
D 4439 Standard Terminology for Geosynthetics
D 4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
D 4873 Guide for Identification, Storage and Handling of Geosynthetics
D 5199 Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes
D 5261 Test Method for Measuring Mass per Unit Area of Geotextiles
D 5323 Practice for Determination of 2% Secant Modulus for Polyethylene Geomembranes
D 5721 Practice for Air-Oven Aging of Polyolefin Geomembranes
D 5884 Test Method for Determining the Tearing Strength of Internally Reinforced Geomembranes
D 5885 Test Method for Oxidation Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry
D 6636 Determination of Ply Adhesion Strength of Reinforced Geomembranes
D 6693 Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes

2.2 GRI Standards

GM 11 Accelerated Weathering of Geomembranes using a Fluorescent UVA-Condensation Exposure Device
GM 16 Test Method for Observation of Surface Cracking of Geomembranes

2.2 U. S. Environmental Protection Agency Technical Guidance Document "Quality Control Assurance and Quality Control for Waste Containment Facilities," EPA/600/R-93/182, September 1993, 305 pgs.

3. Definitions

Manufacturing Quality Control (MQC) - A planned system of inspections that is used to directly monitor and control the manufacture of a material which is factory originated. MQC is normally performed by the manufacturer of geosynthetic materials and is necessary to ensure minimum (or maximum) specified values in the manufactured product. MQC refers to measures taken by the manufacturer to determine compliance with the requirements for materials and workmanship as stated in certification documents and contract specifications.
ref. EPA/600/R-93/182

Manufacturing Quality Assurance (MQA) - A planned system of activities that provides assurance that the materials were constructed as specified in the certification documents and contract specifications. MQA includes manufacturing facility inspections, verifications, audits and evaluation of the raw materials (resins and additives) and geosynthetic products to assess the quality of the manufactured materials. MQA refers to measures taken by the MQA organization to determine if the manufacturer is in compliance with the product certification and contract specifications for the project.
ref. EPA/600/R-93/182

Formulation, n - The mixture of a unique combination of ingredients identified by type, properties and quantity. For flexible polypropylene geomembranes a formulation is defined as the exact percentages and types of resin(s), additives, and carbon black or colorants.

Note 3: The geomembrane referred to in this standard specification shall contain at least 85% flexible polypropylene resin as defined below. The remaining 15% should be identified and communicated between the manufacturer and purchaser.

Flexible Polypropylene, n. [per ASTM D4439] – a material having a 2% secant modulus of less than 300 MPa (40,000 lb/in.^{2}) as determined by ASTM D5323 produced by polymerization of propylene with or without other alpha olefin monomers.

Rework, n - Polymer which has been converted into a geosynthetic material and then ground into chips for reintroduction into the extruder without leaving the plant, e.g., edge trim, out-of-spec thickness material, etc.

4. Material Classification and Formulation

4.1 This specification covers flexible polypropylene geomembranes which are nonreinforced (fPP) and scrim reinforced, hence the designation fPP-R.

4.2 The fPP resin from which the geomembrane is made shall conform to the definition presented in Section 3.

4.3 The fPP resin shall be virgin material with no more than 10% rework. If rework is used, it must be an approved fPP formulation similar to the parent material.

4.4 No post consumer resin (PCR) of any type shall be added to the formulation.

4.5 For reinforced flexible polypropylene, the fabric reinforcement (also called the "scrim") shall be present so as to give the desired specification values to be presented in the next section.

Note 4: Fabric scrims are typically 1000 denier in either a 9×9 weft-inserted or a 10×10 basket pattern (i.e., 9 or 10 yarns per inch width in both machine and cross-machine directions). They are usually made from high tenacity polyester resin. Other polymers and patterns are also possible.

5. Physical, Mechanical and Endurance Property Requirements

5.1 The geomembrane shall conform to the test property requirements prescribed in Tables 1(a) and 1(b). Table 1(a) is in English units and Table 1(b) is in SI (metric) units. The conversion from English to SI (metric) units is soft. It is to be understood that the table refers to the latest revision of the referenced test methods and practices.

Note 5: The tensile strength properties in this specification were originally based on ASTM D 638 which uses a laboratory testing temperature of 23°C ± 2°C. Since ASTM Committee D35 on Geosynthetics adopted ASTM D 6693 (in place of D 638), this GRI Specification followed accordingly. The difference is that D 6693 uses a testing temperature of 21°C ± 2°C. The numeric values of strength and elongation were not changed in this specification. If a dispute arises in this regard, the original temperature of 23°C ± 2°C should be utilized for testing purposes.

Note 6: There are several tests that could have been included in this specification which are omitted because they are outdated, irrelevant or generate information that is not necessary to evaluate on a routine MQC basis. The following tests have been purposely omitted:

- Volatile Loss
- Dimensional Stability
- Coeff. of Linear Expansion
- Resistance to Soil Burial
- Low Temperature Impact
- Wide Width Tensile
- Water Vapor Transmission
- Carbon Black Dispersion
- Water Absorption
- Ozone Resistance
- Modulus of Elasticity
- Hydrostatic Resistance
- Tensile Impact
- Field Seam Strength
- Multi-Axial Burst
- Various Toxicity Tests

Note 7: There are several tests which are included in this standard because they are relevant and important in the context of current manufacturing processes. The following incubation methods and subsequent test methods have been purposely added:

- Oven Aging
- Ultraviolet Resistance by Xenon Arc Method
- Ultraviolet Resistance by UV Fluorescent Method

Note 8: There are other tests in this standard, focused on a particular property, which are updated to current standards. The following are in this category:

- Mass per Unit Area
- Thickness
- Tear Resistance
- Puncture Resistance

Note 9: There are several GRI tests currently included in this standard. Since these topics are not covered in ASTM standards, this is necessary. They are the following:

- UV Fluorescent Weathering
- Ply Adhesion
- Surface Cracking

5.2 Details of the endurance-related procedures, i.e., the oven aging and weatherometer procedures, are as follows:

5.2.1 Oven Aging per ASTM D5721

This incubation process uses forced air ovens set at 85°C and measures the change in oxidation induction time (OIT) on the removed test specimens after 90 days. Note that this requires an initial and unaged determination of the as-received OIT value, i.e., before incubation. The specimens are also evaluated for their cracking potential per GRI GM11.

5.2.2 UV Fluorescent per GRI GM 11
This simulated weathering exposure uses a UV fluorescent device with 340 nm wavelength bulbs and measures the change in oxidative induction time (OIT) after 1600 hours on the removed test specimens. The cycle cam is set to provide 24 hour cycles as follows: 20 hours UV cycle at 75°C followed by 4 hour condensation at 60°C. Note that this requires an initial and unexposed determination of the as-received OIT value, i.e., before incubation. The specimens are also evaluated for their cracking potential per GRI GM 16.

5.2.3 The above endurance-related exposure procedures are to be conducted on nonreinforced fPP sheet. For fPP-R geomembranes, the sample can be obtained from production sheet by using a blocking film so as to obtain sheet with nonadhering scrim, or by using a laboratory line to produce nonreinforced sheet without scrim. The percent values retained listed in Tables 1(a) and 1(b) are referenced to the nonexposed, nonreinforced material under identical conditions.

5.3 The various properties of the fPP and fPP-R geomembrane shall be tested at the minimum frequencies shown in Table 1. If the specific manufacturer's quality control guide is more stringent and is certified accordingly, it must be followed in like manner.

Note 10: This specification is focused on manufacturing quality control (MQC). Conformance testing and manufacturing quality assurance (MQA) testing are at the discretion of the purchaser and/or quality assurance engineer, respectively.

6. Workmanship and Appearance

6.1 Smooth fPP geomembrane shall have good appearance qualities. It shall be free from such defects that would affect the specified properties of the geomembrane.

6.2 Scrim reinforced fPP-R geomembrane shall generally have a uniform undulating appearance. It shall be free from irregular yarns, yarns that are bunched together, yarns crossing over one another, and such defects that would affect the specified properties of the geomembrane.

6.3 For fPP-R geomembranes there is to be no exposed scrim except for roll ends. A 0.375 ± 0.25 in. (10 ± 6 mm) edge encapsulation on each side is required.

6.4 General manufacturing procedures shall be performed in accordance with the manufacturer's internal quality control guide and/or documents.

7. MQC Sampling

7.1 Sampling shall be in accordance with the specific test methods listed in Table 1. If no sampling protocol is stipulated in the particular test method, then test specimens shall be taken evenly spaced across the entire roll width.

7.2 The number of tests shall be in accordance with the appropriate test methods listed in Table 1.

7.3 The average of the test results should be calculated per the particular standard cited and compared to the minimum value listed in these tables, hence the values listed are the minimum average values and are designated as "min. ave."

8. MQC Retest and Rejection

8.1 If the results of any test do not conform to the requirements of this specification, retesting to determine acceptance or rejection should be done in accordance with the manufacturing protocol as set forth in the manufacturer's quality manual.

9. Packaging and Marking

9.1 It is standard within the industry for finished rolls to be adequately protected to keep the material clean and dry until used. Although there are different methods for protection, it is sometimes required that finished rolls are covered with an outer layer of protection. The issue is to be decided upon by the various parties involved.

9.2 The geomembrane shall be rolled onto a substantial core or core segments and held firm by dedicated straps/slings, or other suitable means. The rolls must be adequate for safe transportation to the point of delivery, unless otherwise specified in the contract or order.

9.3 The geomembrane can also be folded in an accordion manner and placed on a wooden pallet. The entire package is to be protected by a cardboard enclosure and the entire assembly banded together with plastic strapping.

9.4 Identify the product per ASTM D4873, which also includes information on storage and handling.

10. Certification

10.1 Upon request of the purchaser in the contract or order, a manufacturer's certification that the material was manufactured and tested in accordance with this specification, together with a report of the test results, shall be furnished at the time of shipment.

11. Warranty

11.1 Upon request of the purchaser in the contract or order, a manufacturer's warrant of the quality of the material shall be furnished at the completion of the terms of the contract.

11.2 A recommended warrant for flexible polypropylene geomembranes manufactured and tested in accordance with this specification is given in Appendix A.

11.3 The warrant in Appendix A is for the geomembrane itself. It does not cover subgrade preparation, installation, seaming, or backfilling. These are separate operations that are often beyond the control, or sphere of influence, of the geomembrane manufacturer.

Note 11: If a warrant is required for installation, it is to be developed between the installation contractor and the party requesting such a document.

Adoption and Revision Schedule

for

fPP Specification per GRI-GM18

"Test Properties, Testing Frequency and Recommended Warrant for Flexible Polypropylene (fPP and fPP-R) Nonreinforced and Reinforced Geomembranes"

Adopted: February 18, 2002

Revision 1: June 23, 2003: Adopted ASTM D 6693, in place of ASTM D 638 for tensile strength testing. Also added Note 5.

ENGLISH UNITS

Table 1(a) – Flexible Polypropylene Nonreinforced (fPP) and Reinforced (fPP-R) Geomembranes

Property	Test Method ASTM or GRI	fPP 30 mils	fPP 40 mils	fPP-R 36 mils	fPP-R 45 mils	Testing Frequency minimum
Mass per Unit Area – lb/ft^2 (min. ave.)	D5261	0.12	0.16	0.15	0.18	15,000 lb
Thickness – mils (min. ave.)	D5199	30	40	36	45	roll
• lowest individual specimen – mils, nominal – 10%		27	36	32	40	
Tensile Strength						
• dumbbell[(1)] – lb/in. (min. ave.)	D6693-IV	60	72	-	-	15,000 lb
• grab[(1)] – lb (min. ave.)	D751-A	-	-	200	250	15,000 lb
Tensile Elongation						
• dumbbell[(1,2)] - % (min. ave.)	D6693-IV	700	700	-	-	15,000 lb
• grab[(1)] - % (min. ave.)	D751-A	-	-	22	22	15,000 lb
Multiaxial Elongation - %	D5617	120	120	-	-	formulation
Tear Resistance						
• nonreinforced[(1)] – lb (min. ave.)	D1004	10	12	-	-	15,000 lb
• reinforced[(1)] – lb (min. ave.)	D5884	-	-	55	55	15,000 lb
Puncture Resistance – lb (min. ave.)	D4833	25	30	75	85	15,000 lb
Ply Adhesion – lb (min. ave.)	D6636	-	-	15	15	15,000 lb
Low Temperature Flexibility - °F	D2136[(3)]	-40	-40	-40	-40	formulation
Carbon Black Content[(4)] - %	D4218	2-3	2-3	2-3	2-3	45,000 lb
		Black (fPP & fPP-R)		Other Colors (fPP & fPP-R)		
Oven Aging at 85°C[(6)]	D5721					formulation
(a) Standard OIT (min. ave.) - % ret. after 90 days	D3895	Note (5)		Note (5)		
- or -						
(b) High Pressure OIT (min. ave.) - % ret. after 90 days	D5885	60		50		
- and -						
(c) Surface Cracking Observation	GM16	none		none		
Ultraviolet Light Resistance[(6,7)]	GM11					formulation
(a) Standard OIT (min. ave.) - % ret. after 1600 hrs.	D3895	Note (5)		Note (5)		
- or -						
(b) High Pressure OIT (min. ave.) - % ret. after 1600 hrs.	D5885	80		60		
- and -						
(c) Surface Cracking Observation	GM16	none		none		

(1) Test methods modified to 20 in./min. for unreinforced and 12 in./min. for reinforced
(2) Calculation based on a 2.0 in. gage length
(3) Using 1/8 in. mandrel for 4-hours.
(4) Applicable only to black geomembranes. Also D1603 is an acceptable method to determine carbon black content.
(5) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some antioxidants used in fPP formulations
(6) It is also recommended to evaluate samples at 15 days to compare with the 30 day response.
(7) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.

SI (METRIC) UNITS

Table 1(b) – Flexible Polypropylene Nonreinforced (fPP) and Reinforced (fPP-R) Geomembranes

Property	Test Method ASTM or GRI	fPP 0.75 mm	fPP 1.0 mm	fPP-R 0.91 mm	fPP-R 1.14 mm	Testing Frequency minimum
Mass per Unit Area – g/m^2 (min. ave.)	D5261	25	33	31	37	7500 kg
Thickness – mm (min. ave.)	D5199	0.75	1.00	0.91	1.14	roll
• lowest individual specimen – mils, nominal – 10%		0.68	.90	0.82	1.03	
Tensile Strength						
• dumbbell(1) – kN/m (min. ave.)	D6693-IV	11	13	-	-	7500 kg
• grab(1) – N (min. ave.)	D751-A	-	-	890	1100	7500 kg
Tensile Elongation						
• dumbbell(1,2) - % (min. ave.)	D6693-IV	700	700	-	-	7500 kg
• grab(1) - % (min. ave.)	D751-A	-	-	22	22	7500 kg
Multiaxial Elongation - %	D5617	120	120	-	-	formulation
Tear Resistance						
• nonreinforced(8) – N (min. ave.)	D1004	45	50	-	-	7500 kg
• reinforced(8) – N (min. ave.)	D5884	-	-	245	245	7500 kg
Puncture Resistance – N (min. ave.)	D4833	110	130	330	380	7500 kg
Ply Adhesion – N (min. ave.)	D6636	-	-	65	65	7500 kg
Low Temperature Flexibility - °C	D2136(3)	-40	-40	-40	-40	formulation
Carbon Black Content(4) - %	D4218	2-3	2-3	2-3	2-3	22,000 kg
		Black (fPP & fPP-R)		Other Colors (fPP & fPP-R)		
Oven Aging at 85°C(6)	D5721					formulation
(a) Standard OIT (min. ave.) - % ret. after 90 days	D3895	Note (5)		Note (5)		
- or -						
(b) High Pressure OIT (min. ave.) - % ret. after 90 days	D5885	60		50		
- and -						
(c) Surface Cracking Observation	GM16	none		none		
Ultraviolet Light Resistance(6,7)	GM11					formulation
(a) Standard OIT (min. ave.) - % ret. after 1600 hrs.	D3895	Note (5)		Note (5)		
- or -						
(b) High Pressure OIT (min. ave.) - % ret. after 1600 hrs.	D5885	80		60		
- and -						
(c) Surface Cracking Observation	GM16	none		none		

(1) Test method modified to 500 mm/min. for unreinforced and 300 mm/min. for reinforced
(2) Calculation based on a 50 mm gage length
(3) Using 32 mm mandrel for 4-hours.
(4) Applicable only to black geomembranes. Also D1603 is an acceptable method to determine carbon black content.
(5) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some antioxidants used in fPP formulations
(6) It is also recommended to evaluate samples at 15 days to compare with the 30 day response.
(7) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.
(8) Tested at 50 mm/min.

Appendix "A"

Typical Flexible Polypropylene (fPP and fPP-R) Warrant

Reviewed by: Donald J. Weiss, Esq.
General Council for GSI

ABC GEOMEMBRANE COMPANY
LIMITED WARRANTY

Warranty No: _____
Project No: _____
Effective Date: _____

PURCHASER NAME: _____ PROJECT NAME: _____

ADDRESS: _____ ADDRESS/LOCATION: _____

CITY, STATE, ZIP, COUNTRY _____ CITY, STATE, ZIP, COUNTRY _____

GEOMEMBRANE TYPE/DESCRIPTION _____

ABC Geomembrane Company warrants each ABC geomembrane to be free from manufacturing defects (as defined by the contract's material specifications) and to be able to withstand normal weathering for a period of 10 years from the above effective date for normal use in approved applications.

This Limited Warranty does not include damages or defects in the ABC geomembrane resulting from acts of God, casualty or catastrophe including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" as used herein does not include, among other things improper handling during transportation, unloading, storage or installation, the exposure of ABC geomembranes to harmful chemicals, atypical atmospheric conditions, weather abuse of ABC geomembranes by machinery, equipment or people; improper site preparation or covering materials, excessive pressures or stresses from any source or improper application or installation. ABC geomembrane material warranty is intended for commercial use only and is not in effect for the consumer as defined in the Magnuson Moss Warranty or any similar federal, state, or local statues. The parties expressly agree that the sale hereunder is for commercial or industrial use only.

Should defects or premature loss of use within the scope of the above Limited Warranty occur, ABC Geomembrane Company will, at its option, repair or replace the ABC geomembrane on a pro-rata basis at the then current price in such manner as to charge the Purchaser/User only for that portion of the warranted life which has elapsed since purchase of the material. ABC Geomembrane Company will have the right to inspect and determine the cause of any alleged defect in the ABC geomembrane and to take appropriate steps to repair or replace the ABC geomembrane if a defect exists which is covered under this warranty. This Limited Warranty extends only to ABC's geomembrane, and does not extend to the installation service of ABC Geomembrane Company or third parties nor does it extend to materials furnished or installed by others in connection with the intended use of the ABC geomembranes.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail, to the President of ABC Geomembrane within ten (10) days of becoming aware of the alleged defect. Should the required notice not be given, the defect and all warranties are waived by the Purchaser, and Purchaser shall not have any rights under this warranty. ABC Geomembrane Company shall not be obligated to perform repairs or replacements under this warranty unless and until the area to be repaired or replaced is clean, dry, and unencumbered. This includes, but is not limited to, the area made available for repair and/or replacement of ABC geomembrane to be free from all water, dirt, sludge, residuals and liquids of any kind. If after inspection it is determined that there is no claim under this Limited Warranty, Purchaser shall reimburse ABC Geomembrane Company for its costs associated with the site inspection.

In the event the exclusive remedy provided herein fails in its essential purpose, and in that event only, the Purchaser shall be entitled to a return of the purchase price for so much of the material as ABC Geomembrane Company determines to have violated the warranty provided herein. ABC Geomembrane Company shall not be liable for direct, indirect, special, consequential or incidental damages resulting from a breach of this warranty including, but not limited to, damages for loss of production, lost profits, personal injury or property damage. ABC Geomembrane Company shall not be obligated to reimburse Purchaser for any repairs, replacement, modifications or alterations made by Purchaser unless ABC Geomembrane Company specifically authorized, in writing, said repairs, replacements, modifications or alteration in advance of them having been made. ABC Geomembrane Company's liability under this warranty shall in no event exceed the replacement cost of the material sold to the Purchaser for the particular installation in which it failed.

ABC Geomembrane Company neither assumes nor authorizes any person other than the undersigned of ABC Geomembrane Company to assume for it any other or additional liability in connection with the ABC geomembrane made on the basis of the Limited Warranty. The Limited Warranty on the ABC geomembrane herein is given in lieu of all other possible material warranties, either expressed or implied, and by accepting delivery of the material, Purchaser waives all other possible warranties, except those specifically given. This Limited Warranty may only be modified by written document mutually executed by Owner and ABC Geomembrane Co.

Limited Warranty is extended to the purchaser/owner and is non-transferable and non-assignable; i.e., there are no third-party beneficiaries to this warranty.

Purchaser acknowledges by acceptance that the Limited Warranty given herein is accepted in preference to any and other possible materials warranties.

THIS LIMITED WARRANTY SHALL BE GOVERNED BY _____ (state) LAW AND VENUE FOR ALL LEGAL PROCEEDINGS IN CONNECTION WITH THIS LIMITED WARRANTY SHALL BE IN _____(county, state). ABC GEOMEMBRANE COMPANY MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN ABOVE AND HEREBY DISCLAIMS ALL WARRANTIES, BOTH EXPRESSED OR IMPLIED, OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS IS THE ONLY WARRANTY THAT APPLIES TO THE MATERIALS REFERRED TO HEREIN AND ABC DISCLAIMS ANY LIABILITY FOR ANY WARRANTIES GIVEN BY ANY OTHER PERSON OR ENTITY, EITHER WRITTEN OR ORAL.

ABC GEOMEMBRANE COMPANY'S WARRANTY BECOMES AN OBLIGATION OF ABC GEOMEMBRANE COMPANY TO PERFORM UNDER THE WARRANTY ONLY UPON RECEIPT OF FINAL PAYMENT AND EXECUTION BY A DULY AUTHORIZED OFFICER OF ABC GEOMEMBRANE COMPANY.

I hereby state that I have read and understand the above and foregoing and agree to such by signing hereunder and agree that but for the warranties provided herein, no other warranties or representatives of ABC Co. have been made by agents or representatives of ABC Co. and this Limited Warranty supersedes all other documents or agreements concerning the warranty of the geomembrane.

PURCHASER NAME: _____ ABC GEOMEMBRANE COMPANY: _____
(President or Authorized Representative)

SIGNATURE: _____ DATE _____ SIGNATURE: _____ DATE _____

TITLE: _____ Sworn before me this _____ day of _____ 200___

(8) Tested at 2.0 in./min.