SECTION 07 26 00

VAPOR RETARDERS

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\*\* NOTE TO SPECIFIER \*\* Reef Industries, Inc.; reinforced, laminated vapor retarders for roof deck, wall, and under concrete slab applications.. Not all products are suitable for use on roof decks, on walls, and under concrete slab applications.
 .
This section is based on the products of Reef Industries, Inc., which is located at:
9209 Almeda Genoa Rd
Houston, TX 77075
Tel: (800) 231-6074
Tel: (713) 507-4200
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Website:HYPERLINK "http://www.reefindustries.comdivision.php?div=1"www.reefindustries.com
Reef Industries, Inc. has a state-of-the-art manufacturing facility and two leading edge fabrication plants supporting world wide sales activities. In-house technical service and research staffs, manned by highly knowledgeable engineers and chemists, work closely with the most experienced sales department in the industry. In 1957, the Griffolyn Company, now a division of Reef Industries, patented a new process for the production of internally reinforced film laminates. The resulting high strength and light weight offered easily handled and ruggedly durable constructions never previously available that rapidly replaced heavier, bulkier and more expensive materials.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Reinforced vapor retarders.
		2. Tape to seal joints and repair vapor retarder.
		3. Pipe boots for sealing penetrations.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete.
		2. Section 05 36 00 - Composite Metal Decking.
		3. Section 05 40 00 - Cold-Formed Metal Framing.
		4. Section 06 10 00 - Rough Carpentry.
		5. Section 06 15 00 - Wood Decking..
		6. Section 06 16 36 - Wood Panel Product Sheathing.
		7. Section 07 22 13 - Asphaltic Perlite Concrete Deck.
		8. Section 07 41 13 - Metal Roof Panels.
		9. Section 07 40 00 - Roofing and Siding Panels.
		10. Section 07 50 00 - Membrane Roofing.
		11. Section 07 61 00 - Sheet Metal Roofing.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ASTM International (ASTM):
			1. ASTM D 882 - Tensile Properties of Thin Plastic Sheeting.
			2. ASTM D 1709 - Impact Resistance of Plastic Film by the Free-Falling Dart Method.
			3. ASTM D 2582 - Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
			4. ASTM D 3776 - Mass Per Unit Area (Weight) of Woven Fabric.
			5. ASTM D 4833 - Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
			6. ASTM E 84 - Surface Burning Characteristics of Building Materials.
			7. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
			8. ASTM E 1643 - Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
			9. ASTM E 1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
		2. National Fire Protection Association (NFPA): NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data: Manufacturer's data sheets on each product to be used, including:
			1. Preparation instructions and recommendations.
			2. Storage and handling requirements and recommendations.
			3. Installation methods.
		3. Samples: Submit manufacturer's samples of reinforced vapor retarders.

\*\* NOTE TO SPECIFIER \*\* Delete selection samples if not required for verification of product proposed for use.

* + 1. Verification Samples: For each product specified, two samples, minimum size 5 inches (125 mm) square, representing actual product.
	1. QUALITY ASSURANCE
		1. Preinstallation Meeting: Convene a preinstallation meeting two weeks before start of installation of reinforced vapor retarders. Require attendance of parties directly affecting work of this section, including Contractor, Architect, and installer. Review installation, protection, and coordination with other work.
	2. DELIVERY, STORAGE, AND HANDLING
		1. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
		2. Storage:
			1. Store products in manufacturer's unopened packaging until ready for installation.
			2. Store materials in a clean, dry area in accordance with manufacturer's instructions.
		3. Handling: Protect materials during handling and installation to prevent damage.
1. PRODUCTS
	1. MANUFACTURER
		1. Acceptable Manufacturer: Griffolyn, Division of Reef Industries, Inc., which is located at: 9209 Almeda Genoa Rd.; Houston, TX 77075; Toll Free Tel: 800-231-6074; Tel: 713-507-4251; Fax: 713-507-4295; Email: [request info (ri@reefindustries.com)](https://admin.arcat.com/users.pl?action=UserEmail&company=Griffolyn,+Division+of+Reef+Industries,+Inc.&coid=32859&rep=&fax=713-507-4295&message=RE:%20Spec%20Question%20(07260ree):%20%20&mf=); Web: <https://www.reefindustries.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
	1. REINFORCED VAPOR RETARDERS

\*\* NOTE TO SPECIFIER \*\* Delete all of the following products that are not required. If more than one type of reinforced vapor retarder is required, be sure to indicate where each is to be used, either by specifying the application(s) for each or by giving each a unique name that can be referenced on the drawings.
 .
 The products are listed below in descending order of performance, with the highest performing listed first. Fire retardant products are listed first, followed by a product with high puncture resistance, followed by all other products listed in order of vapor permeance and puncture resistance. See the notes preceding each product for more information.
\*\* NOTE TO SPECIFIER \*\* Griffolyn Type 90 FR is the superior grade product for use only on roof decks and on walls. It is not suitable for use under concrete slabs.

* + 1. Fire Retardant Reinforced Vapor Retarder: Griffolyn Type-90 FR.
			1. Material: Fire retardant 5-ply laminate, combining three layers of linear low-density polyethylene and two high-strength non-woven cord grids.
			2. Weight: 69 lb/1,000 sq ft (33.7kg/100 sq m), when tested in accordance with ASTM D 3776.
			3. Puncture Propagation Tear: 45 lb (187 N), when tested in accordance with ASTM D 2582.
			4. Permeance (Perm): 0.028 grains/hr-sq ft-in Hg (1.61 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.
			5. Drop Dart: 2400 g, when tested in accordance with ASTM D 1709.
			6. Tensile Strength: 180 lb/3,750 psi (800 N/ 25.8 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) wide specimen.
			7. Puncture Strength: 54 lb (209 N), when tested in accordance with ASTM D 4833.
			8. Surface Burning Characteristics:
				1. Large Scale: Pass, when tested in accordance with NFPA 701.
				2. Class I, Class B flame spread rating. Flame spread 5, smoke developed 135, when tested in accordance with ASTM E 84.
			9. Usable Temperature Range: Minus 40 to 170 degrees F (minus 40 to 77 degrees C).

\*\* NOTE TO SPECIFIER \*\* Delete application that does not apply.

* + - 1. Application(s):
				1. Use on roof decks under insulation.
				2. Use on exterior walls on inside face of framing.

\*\* NOTE TO SPECIFIER \*\* Griffolyn Type TX-1200 FR is the premium grade product for use only on roof decks and on walls. It is not suitable for use under concrete slabs.

* + 1. Fire Retardant Reinforced Vapor Retarder: Griffolyn TX-1200 FR.
			1. Material: Fire retardant 3-ply laminate, combining two layers of linear low-density polyethylene and one high-strength non-woven cord grid.
			2. Weight: 45 lb/1,000 sq ft (22 kg/100 sq m), when tested in accordance with ASTM D 3776.
			3. Puncture Propagation Tear: 35 lb (156 N) , when tested in accordance with ASTM D 2582.
			4. Permeance (Perm): 0.036 grains/hr-sq ft-in Hg (2.06 ng/(Pa-s-sq m)) , when tested in accordance with ASTM E 96.
			5. Drop Dart: 1090g, when tested in accordance with ASTM D 1709 Method B.
			6. Tensile Strength: 135 lb/5,600 psi (600 N/38.6 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) wide specimen.
			7. Puncture Strength: 48 lb (210 N), when tested in accordance with ASTM D 4833.
			8. Surface Burning Characteristics:
				1. Large Scale: Pass, when tested in accordance with NFPA 701.
				2. Class I, Class A flame spread rating. Flame spread 5, smoke developed 70, when tested in accordance with ASTM E 84.
			9. Usable Temperature Range: Minus 10 to 170 degrees F (minus 23 to 77 degrees C).

\*\* NOTE TO SPECIFIER \*\* Delete application that does not apply.

* + - 1. Application(s):
				1. Use on roof decks under insulation.
				2. Use on exterior walls on inside face of framing.

\*\* NOTE TO SPECIFIER \*\* Griffolyn Type-55 FR is the standard fire-retardant grade for use only on roof decks and on walls. It is not suitable for use under concrete slabs.

* + 1. Fire Retardant Reinforced Vapor Retarder: Griffolyn Type-55 FR.
			1. Material: Fire retardant 3-ply laminate, combining two layers of linear low-density polyethylene and one high-strength non-woven cord grid.
			2. Weight: 33 lb/1,000 sq ft (16.1 kg/100 sq m) , when tested in accordance with ASTM D 3776.
			3. Puncture Propagation Tear: 26 lb (111 N) , when tested in accordance with ASTM D 2582.
			4. Permeance (Perm): 0.062 grains/hr-sq ft-in Hg (3.556 ng/(Pa-s-sq m)) , when tested in accordance with ASTM E 96.
			5. Drop Dart: 450 g, when tested in accordance with ASTM D 1709.
			6. Tensile Strength: 90 lb/5,050 psi (378 N/34.8 MPa) , when tested in accordance with ASTM D 882, 3 inch (76 mm) wide specimen.
			7. Puncture Strength: 30 lb (133 N) , when tested in accordance with ASTM D 4833.
			8. Surface Burning Characteristics:
				1. Large Scale: Pass, when tested in accordance with NFPA 701.
				2. Class I, Class A flame spread rating. Flame spread 5, smoke developed 45, when tested in accordance with ASTM E 84.
			9. Usable Temperature Range: Minus 5 to 150 degrees F (minus 20 to 66 degrees C).

\*\* NOTE TO SPECIFIER \*\* Delete application that does not apply.

* + - 1. Application(s):
				1. Use on roof decks under insulation.
				2. Use on exterior walls on inside face of framing.

\*\* NOTE TO SPECIFIER \*\* Griffolyn Type 65 G is suitable for use only under concrete slabs. It is not suitable for use on roof decks and on walls. It has the greatest puncture resistance of all Griffolyn products.

* + 1. Reinforced Vapor Retarder: Griffolyn Type-65 G for use under concrete slabs; complying with ASTM E 1745 Class A.
			1. Material: 4-ply laminate, combining 2 layers of high-density polyethylene and a high-strength non-woven cord grid with a layer of non-woven geotextile fiber.
			2. Weight: 73 lb/1,000 sq ft (35.7 kg/100 sq m), when tested in accordance with ASTM D 3776.
			3. Puncture Propagation Tear: 55 lb (245 N), when tested in accordance with ASTM D 2582.
			4. Permeance (Perm): 0.038 grains/hr-sq ft-in Hg (2.18 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.
			5. Drop Dart: 2300 g, when tested in accordance with ASTM D 1709.
			6. Tensile Strength: 160 lb/1,350psi (710 N/9.3 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) wide specimen.
			7. Puncture Strength: 60 lb (265 N), when tested in accordance with ASTM D 4833.
			8. Classification: Class A, when tested in accordance with ASTM E 1745.
			9. Usable Temperature Range: Minus 25 to 170 degrees F (minus 32 to 77 degrees C).

\*\* NOTE TO SPECIFIER \*\* Delete application that does not apply.

* + - 1. Application: Use under concrete slabs, over aggregate fill.
			2. Application: Use under concrete slabs, under aggregate fill.

\*\* NOTE TO SPECIFIER \*\* Griffolyn Vaporguard has extra low permeance and is suitable for roofs, walls, and under slabs; it is somewhat less puncture resistant than the product below.

* + 1. Reinforced Vapor Retarder: Griffolyn Vaporguard; complying with ASTM E 1745 Class B.
			1. Material: 3-ply laminate, with an aluminum core surrounded by two layers of multi-axially oriented, high-density polyethylene.
			2. Weight: 84 lb/1,000 sq ft (41 kg/100 sq m), when tested in accordance with ASTM D 3776.
			3. Puncture Propagation Tear: 42 lb (178 N), when tested in accordance with ASTM D 2582.
			4. Permeance (Perm): 0.000 grains/hr-sq ft-in Hg (0.000 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.
			5. Drop Dart: 1750 g, when tested in accordance with ASTM D 1709.
			6. Tensile Strength: 105 lb/2,200 psi (467 N/15.16 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) wide specimen.
			7. Puncture Strength: 45 lb (200 N) , when tested in accordance with ASTM D 4833.
			8. Usable Temperature Range: Minus 40 to 170 degrees F (minus 40 to 77 degrees C).

\*\* NOTE TO SPECIFIER \*\* Delete application that does not apply.

* + - 1. Application(s):
				1. Use on roof decks under insulation.
				2. Use on exterior walls on inside face of framing.
				3. Use under concrete slabs, over aggregate fill.

\*\* NOTE TO SPECIFIER \*\* Griffolyn Type-105 is the superior grade product for roofs, walls, and under slabs.

* + 1. Reinforced Vapor Retarder: Griffolyn Type-105; complying with ASTM E 1745 Class A.
			1. Material: 7-ply laminate, combining four layers of high-density polyethylene and three high-strength non-woven cord grids.
			2. Weight: 91 lb/1,000 sq ft (44.4kg/100 sq m), when tested in accordance with ASTM D 3776.
			3. Puncture Propagation Tear: 55 lb (245 N), when tested in accordance with ASTM D 2582.
			4. Permeance (Perm): 0.019 grains/hr-sq ft-in Hg (1.207 ng/(Pa-s-sq m)) when tested in accordance with ASTM E 96.
			5. Drop Dart: 2,300 g, when tested in accordance with ASTM D 1709.
			6. Tensile Strength: 275 lb/5,464 psi (1,223 N/37.7 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) wide specimen.
			7. Puncture Strength: 79 lb (350 N), when tested in accordance with ASTM D 4833.
			8. Usable Temperature Range: Minus 45 to 170 degrees F (minus 42 to 77 degrees C).

\*\* NOTE TO SPECIFIER \*\* Delete application that does not apply.

* + - 1. Application(s):
				1. Use on roof decks under insulation.
				2. Use on exterior walls on inside face of framing.
				3. Use under concrete slabs, over aggregate fill.
				4. Use under concrete slabs, under aggregate fill.

\*\* NOTE TO SPECIFIER \*\* Griffolyn Type-85 is the premium grade product for roofs, walls, and under slabs.

* + 1. Reinforced Vapor Retarder: Griffolyn Type-85; complying with ASTM E 1745 Class B.
			1. Material: 5-ply laminate, combining three layers of high-density polyethylene and two high-strength non-woven cord grids.
			2. Weight: 70 lb/1,000 sq ft (34.2 kg/100 sq m), when tested in accordance with ASTM D 3776.
			3. Puncture Propagation Tear: 55 lb (245 N), when tested in accordance with ASTM D 2582.
			4. Permeance (Perm): 0.027 grains/hr-sq ft-in Hg (1.551 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.
			5. Drop Dart: 1,900 g, when tested in accordance with ASTM D 1709.
			6. Tensile Strength: 225 lb/3,846 psi (1000 N/26.6 MPa), when tested in accordance ASTM D 882, 3 inch (76 mm) wide specimen.
			7. Puncture Strength: 50 lb (222 N), when tested in accordance with ASTM D 4833.
			8. Usable Temperature Range: Minus 40 to 170 degrees F (minus 40 to 77 degrees C).

\*\* NOTE TO SPECIFIER \*\* Delete application that does not apply.

* + - 1. Application(s):
				1. Use on roof decks under insulation.
				2. Use on exterior walls on inside face of framing.
				3. Use under concrete slabs, over aggregate fill.
				4. Use under concrete slabs, under aggregate fill.

\*\* NOTE TO SPECIFIER \*\* Griffolyn Type 65 is the standard grade product for roofs, walls and under slabs.

* + 1. Reinforced Vapor Retarder: Griffolyn Type-65; complying with ASTM E 1745 Class C.
			1. Material: 3-ply laminate, combining two layers of high-density polyethylene and one high-strength non-woven cord grid.
			2. Weight: 40 lb/1,000 sq ft (19.5 kg/100 sq m, when tested in accordance with ASTM D 3776.
			3. Puncture Propagation Tear: 30 lb (133 N), when tested in accordance with ASTM D 2582.
			4. Permeance (Perm): 0.038 grains/hr-sq ft-in Hg (2.18 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.
			5. Drop Dart: 475 g, when tested in accordance with ASTM D 1709.
			6. Tensile Strength: 100 lb/4560 psi (444 N/31.5 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) long test specimen.
			7. Puncture Strength: 35 lb (155 N), when tested in accordance with ASTM D 4833.
			8. Usable Temperature Range: Minus 25 to 170 degrees F (minus 32 to 77 degrees C).

\*\* NOTE TO SPECIFIER \*\* Delete application that does not apply.

* + - 1. Application(s):
				1. Use on roof decks under insulation.
				2. Use on exterior walls on inside face of framing.
				3. Use under concrete slabs, over aggregate fill.
				4. Use under concrete slabs, under aggregate fill.
		1. Vapor Retarder: Griffolyn 10 Mil Green; complying with ASTM E 1745 Class A.
			1. Material: Extruded polyethylene film
			2. Weight: 49 lbs/1,000 sq ft (23.9 kg/100 sq m), when tested in accordance with ASTM D 3776.
			3. Puncture Propagation Tear: 34 lb (150 N), when tested in accordance with ASTM D 2582.
			4. Permeance (Perm): 0.027 grains/hr-sq ft-in Hg (1.549 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.
			5. Drop Dart: 2270 g, when tested in accordance with ASTM D 1709.
			6. Tensile Strength (1" Tensile) : 44 lb/4400 psi (195 N/30.3 MPa), when tested in accordance with ASTM D 882, .
			7. Puncture Strength: 24 lb (107 N), when tested in accordance with ASTM D 4833.
			8. Usable Temperature Range: Minus 25 to 170 degrees F (minus 32 to 77 degrees C).

\*\* NOTE TO SPECIFIER \*\* Delete application that does not apply.

* + - 1. Application(s):
				1. Use on roof decks under insulation.
				2. Use on exterior walls on inside face of framing.
				3. Use under concrete slabs, over aggregate fill.
				4. Use under concrete slabs, under aggregate fill.
		1. Vapor Retarder: Griffolyn 15 Mil Green; complying with ASTM E 1745 Class A.
			1. Material: Extruded polyethylene Film
			2. Weight: 73 lb/1,000 sq ft (35.6 kg/100 sq m, when tested in accordance with ASTM D 3776.
			3. Puncture Propagation Tear: 46 lb (204 N), when tested in accordance with ASTM D 2582.
			4. Permeance (Perm): 0.018 grains/hr-sq ft-in Hg (1.032 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.
			5. Drop Dart: 3150 g, when tested in accordance with ASTM D 1709.
			6. Tensile Strength (1" Tensile): 72 lb/4800 psi (320 N/33.100 MPa), when tested in accordance with ASTM D 882.
			7. Puncture Strength: 24 lb (107 N), when tested in accordance with ASTM D 4833.
			8. Usable Temperature Range: Minus 25 to 170 degrees F (minus 32 to 77 degrees C).

\*\* NOTE TO SPECIFIER \*\* Delete application that does not apply.

* + - 1. Application(s):
				1. Use on roof decks under insulation.
				2. Use on exterior walls on inside face of framing.
				3. Use under concrete slabs, over aggregate fill.
				4. Use under concrete slabs, under aggregate fill.
	1. ACCESSORIES

\*\* NOTE TO SPECIFIER \*\* Delete accessories not required.

* + 1. General: Ensure accessories are from same manufacturer as reinforced vapor retarders.
		2. Mastic Tape: Griffolyn Fab Tape. RI Part Number: 60-0002.
			1. Description: Black, double-sided, asphaltic, pressure-sensitive, mastic tape.
			2. Weight: 3.75 pounds per 100 feet (1.7 kg per 30 m).
			3. Thickness: 35 mils (0.9 mm).
			4. 3 Inch Seam Shear: 35 pounds (156N).
		3. Self-Adhesive Repair Tape: Griffolyn Sealant Tape RI Part Number: 60-0153.
			1. Description: Reinforced white backing with Gray Adhesive.
			2. Weight: 3.0 lbs for 4 inch x 50 foot roll.
			3. Thickness: 26 mils (0.65 mm).
			4. 3 inch Seam Shear: 30 lbs (134 N)
		4. Fire Retardant Self-Adhesive Tape: Griff Tape FR RI Part Number 60-0151.
			1. Description: White backed adhesive tape.
			2. Weight: 3.75 lbs per roll, 4 inches x 180 feet long.
			3. Thickness: 5 mils(0.125 mm).
			4. Adhesion to Steel: 66 oz/in (18 N/in).
		5. Pipe Boots: Griffolyn pipe boots, factory-fabricated.
		6. Batten Strips: Manufacturer's standard for required application.
		7. Fasteners: Manufacturer's standard for required application.
1. EXECUTION
	1. EXAMINATION
		1. Examine surfaces and areas to receive reinforced vapor retarders. Notify Architect in writing of defects of work and other unsatisfactory site conditions that would cause defective installation of vapor retarders. Do not begin installation until unacceptable conditions have been corrected.
		2. Verify site dimensions.
		3. Commencement of work will imply acceptance of substrate.
	2. INSTALLATION

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs.

* + 1. Install reinforced vapor retarders in accordance with manufacturer's instructions.
		2. Install reinforced vapor retarders in accordance with manufacturer's instructions and ASTM E 1643 at concrete slabs.
		3. Install vapor retarders continuously at locations as indicated on the drawings. Ensure there are no discontinuities in vapor retarder at seams and penetrations.
		4. Install vapor retarders in largest practical widths.
		5. Ensure surface beneath vapor retarder is smooth with no sharp projections.
		6. Join sections of vapor retarder and seal penetrations in vapor retarder with mastic tape. Ensure vapor retarder surfaces to receive mastic tape are clean and dry.
		7. Immediately repair holes in vapor retarder with self-adhesive repair tape.
		8. Seal around pipes and other penetrations in vapor retarder with pipe boots in accordance with manufacturer's instructions.
	1. PROTECTION

\*\* NOTE TO SPECIFIER \*\* Delete any of the three protection requirements below that are not required.

* + 1. Protect reinforced vapor retarders from damage until covered by roof insulation.
		2. Protect reinforced vapor retarders from damage until covered by wall finish.
		3. Protect reinforced vapor retarders from damage during installation of reinforcing steel and utilities and during placement of granular materials or concrete slab.
		4. Immediately repair damaged vapor retarder in accordance with manufacturer's instructions.

END OF SECTION