
Biobarrier[®] Manual

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(Material Safety Data Sheets Available Upon Request – 1-800-284-2780)

Introduction

Biobarrier[®] utilizes an award-winning, state-of-the-art technology. Developed as a long-term solution for vegetative root intrusion and possible structure damage, Biobarrier combines a proven geotextile fabric with a proven preemergence herbicide. The only active ingredient in Biobarrier, trifluralin, has been used extensively in commercial applications for more than 40 years and continues to be widely recognized as a leading preemergence herbicide.

The patented controlled-release process, unique to Biobarrier, delivers only the amount of trifluralin biologically necessary to inhibit root growth. Biobarrier's innovative technology ensures that precise amounts of herbicide will be dispersed at the correct location for an extended time. This provides a distinct advantage over repeated applications of herbicides required by conventional methods. **The U.S. EPA does not require a pesticide applicator license to install Biobarrier, however, local regulations may apply, so please check for your area.**

On the following pages, standard installation procedures for a broad variety of Biobarrier applications are summarized.

Should you require additional drawings or instructions, please call 1-800-284-2780, Ext. 7137 or 7054 and we will be happy to assist you.

Biobarrier[®] is manufactured and marketed by:



REEMAY, INC.

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Old Hickory, TN 37138-3651

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(615) 847-7000

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Mechanism

How Biobarrier® Works...

Biobarrier® consists of composite nodules injection-molded through Typar®*, a spunbonded polypropylene geotextile fabric. The through injection molding technique ensures permanent nodule attachment. Impregnated with trifluralin, the nodules function as a protective reservoir. The nodule composition is designed to slowly release trifluralin vapors, which adsorb in the soil.

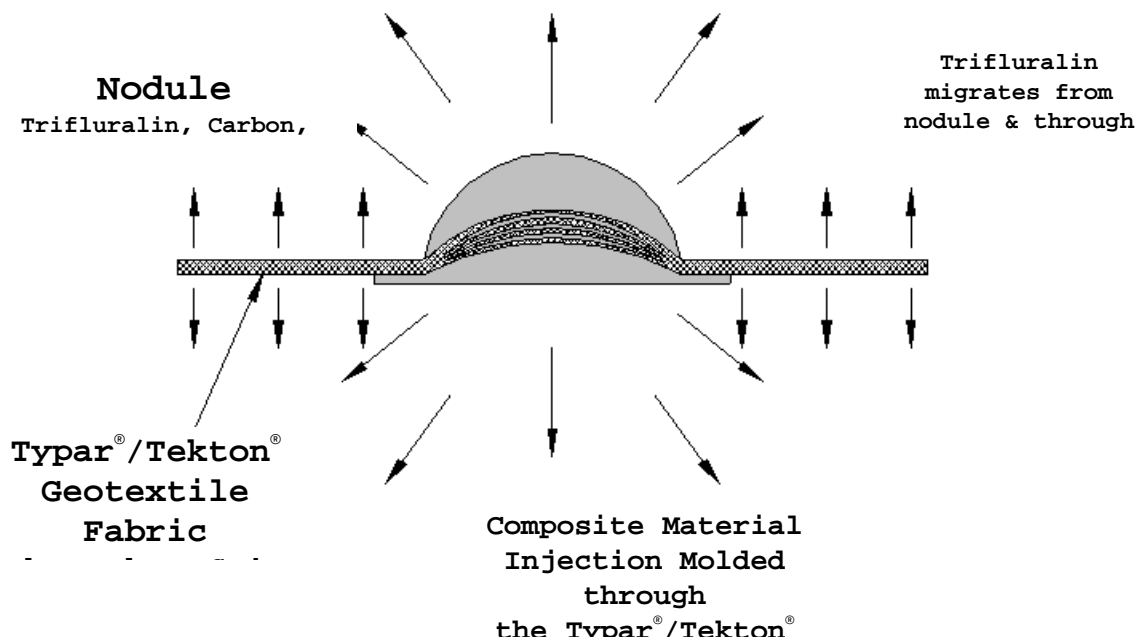
Outside the nodule, the trifluralin degrades but is continuously replaced by new material, building and maintaining a root inhibition zone. Accurate nodule spacing ensures the individual nodule zones overlap and reinforce each other. At equilibrium, the inhibition zone becomes contiguous, enveloping the Biobarrier fabric.

When roots enter the inhibition zone, root tip cells cannot divide, preventing growth in that direction. Trifluralin is not systemic; therefore, it is not taken into the plant. As a result, the root system is diverted away from the Biobarrier-protected structure without adversely affecting the desirable plants or trees. Root branches outside of the zone are not affected.

By utilizing a technology that combines a proven geotextile drainage fabric with an effective preemergence herbicide, Biobarrier II, marketed as a preemergence weed control fabric for landscaping, prevents grass and weed growth without affecting desirable plants. When covered with 2" (50 mm) of mulch, stone, or other medium, the trifluralin inhibition zone both above and below the plane of the fabric blocks grass and weeds from establishing a viable root system needed to support growth. Additional protection is provided by the 4 oz./sq. yd. (136 g/sq. m) geotextile fabric, which blocks existing grass, and weeds from coming up through the fabric. New plants or desirable existing plants that have roots below the 2" (50 mm) inhibition zone are not adversely affected.

*Tekton is the trademark used for polypropylene products outside of North, Central and South America, Israel and South Africa.

Nodule Cross-Section

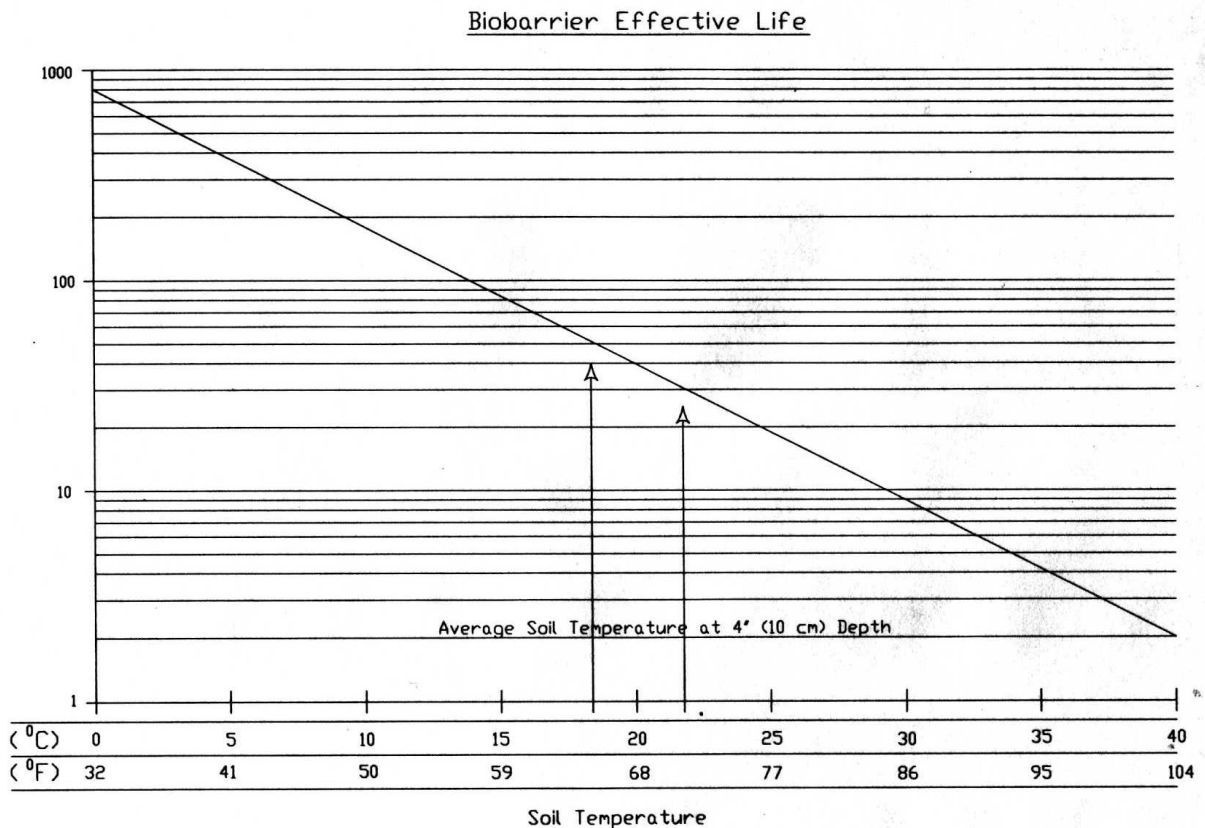


How Trifluralin Works...

The root inhibition zone is created and maintained by the trifluralin released from the nodules. Consequently, the highest trifluralin concentration in the soil is at the plane of the barrier, with concentration levels diminishing as distance from the barrier increases. The concentration level effective for all roots measured is less than 7.6 ppm. Plant species vary in resistance to trifluralin. This concentration level at zone equilibrium, based on field and laboratory measurements, occurs approximately 1" (25 mm) from the barrier. Some root branch elongation may occur after the root tip meets the effective concentration level, pushing the tip within the 1" (25 mm) zone.

With a water solubility of 0.3 ppm, trifluralin does not present a significant leaching problem. Additionally, trifluralin has a high soil adsorption and short half-life.

With a U.S. EPA Class IV rating and an Oral LD50 of 10,000, technical grade trifluralin is considered practically non-toxic, ranking it between sugar (29,700) and salt (3,000). Since only a minute amount of trifluralin is emitted from the Biobarrier nodules at any point in time, the hazard is minimized. . NOTE: **The United States EPA does not require a pesticide applicator license to install Biobarrier®. Check agency in your area for local regulations**

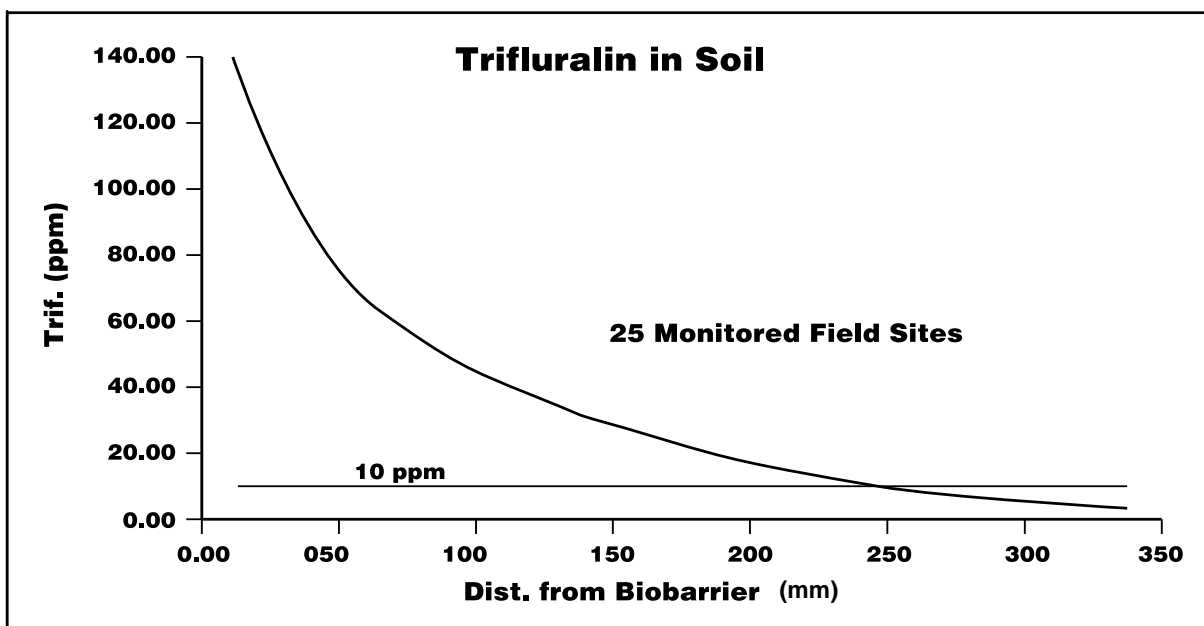


Technical Data - Biobarrier®

The hemispherical shaped nodules on Biobarrier contain one active ingredient (trifluralin) and two inactive ingredients (polyethylene and carbon black). Biobarrier is engineered to release the trifluralin very slowly in vapor form and establish a narrow (see chart below) protective chemical zone in soil adjacent to the fabric. This unique delivery method, combined with the chemical characteristics of trifluralin detailed below, ensure that the chemical zone remains very near the fabric and does not present a significant leaching problem. Trifluralin has been used extensively in commercial applications for over 40 years and widely recognized as a leading preemergence herbicide. See EPA Toxicity Rating for trifluralin below. NOTE: **The United States EPA does not require a pesticide applicator license to install Biobarrier®. Check agency in your area for local regulations**

<i>Environmental Fate of Trifluralin</i>	
Solubility in Water	<0.3 ppm @ 25°C
Vapor Pressure (mm Hg @ 25°C)	1×10^{-4}
Degradation In Soil	1 to 6 Months
<i>Half Life</i>	
Air Photolysis	42 Minutes
Water Photolysis	9 Hours
Soil Photolysis (Dark)	41 Days
Soil Photolysis (Light)	66 Days

<i>EPA Toxicity Ratings</i>	
<u>Classifications</u> LD 50 (mg. Kg.)	
1. Extremely Toxic	50
2. Highly Toxic	50 to 500
3. Moderately Toxic	500 to 5,000
4. Practically Non-Toxic	5,000 to 15,000
<i>*Toxicity Examples</i>	
1. Nicotine	32
2. Aspirin	1,000
3. Salt	3,000
4. Trifluralin	10,000



Biobarrier® Root Control

Biobarrier® II Preemergence Weed Control

General Installation Guidelines

THESE GENERAL GUIDELINES MUST BE FOLLOWED IN ALL BIOBARRIER INSTALLATIONS.

REFER TO PAGE 9 FOR INDEX OF SPECIFIC INSTRUCTIONS

- Review site-specific design plan with a certified local arborist for all applications specifically for depth of Biobarrier required and **ESPECIALLY IF ROOT TRIMMING IS REQUIRED!**
- Contact utility companies prior to digging or trenching in the event service lines are present.
- Wear chemical resistant gloves when handling Biobarrier to prevent staining.
- See product label and MSDS sheet for further information.
- **Do not allow gaps in fabric during installation or backfilling.**
- Many severed roots can regenerate, so they should always be completely removed. If removal is not possible, a systemic herbicide must be applied to severed roots to prevent re-growth. The systemic herbicide should be carefully applied, according to manufacturer directions, insuring that it does not come in contact with existing tree roots. This could damage or kill the tree.

In high organic soils (>10%) with aggressive root species in close proximity to olefin plastics, spray or saturate trench walls with liquid trifluralin.

- When joining two pieces of Biobarrier®, be sure they do not become separated at any point. Seaming can be accomplished by using construction adhesive and/or overlapping. If the latter is used, seams should be overlapped at least 3 inches (or 2 nodule widths). Sod pins may also be used for seams, but make sure there are no gaps.
- Biobarrier® should not be left exposed to surface water or sunlight for more than 12 hours since high temperatures and sunlight reduce effective life of product.
- Biobarrier® products are for non-food uses only.

Biobarrier® stops roots within ~1 inch of a nodule. Proper placement is very important; it is only effective where it is!

For Technical Assistance on any of these applications, call 1-800-284-2780

Biobarrier[®]

Root Control System

Installation Instructions for Vertical Installation

BEFORE YOU START:

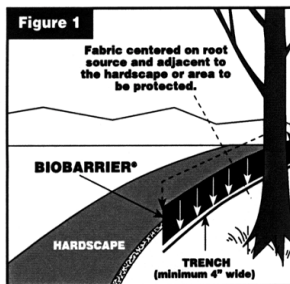
- Contact your utility company prior to trenching if you suspect service lines are present. Consult a professional arborist if root trimming is required.
- Follow all EPA label instructions located on the box and yellow packaging sleeve when installing product. Additional instructions in box.

IMPORTANT NOTES:

- Biobarrier should be installed on the side of the trench opposite the root source.
- Install and cover Biobarrier as soon as possible (within 12 hours) after opening sealed yellow bag; high temperatures and direct sunlight can reduce effective product life.

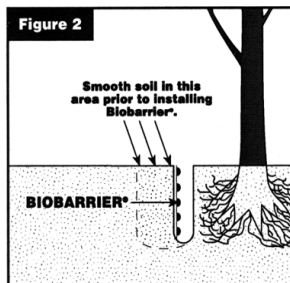
INSTALLING THE PRODUCT:

- Cut a trench a minimum of 4 inches (100mm) wide and at least equal to the length of mature tree canopy plus 10 feet, centered on the root source and adjacent to the structure using clean-cutting trench digging equipment (see figure 1).



- Cut all roots back flush to trench walls on both sides of trench. For some species, it may be necessary to spray the cut end of the severed root on the side opposite tree to prevent root regrowth under the hardscape. If this is necessary, use a systematic herbicide and be extremely careful to avoid contact with roots on the opposite side of the trench.

- Smooth soil surface to desired FINAL GRADE LEVEL on side of trench opposite root source (see Figure 2).

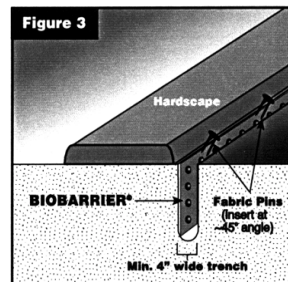


- CAREFULLY open yellow bag of Biobarrier on one end to prevent damage. Use yellow bag to store any unused product.

- Roll out Biobarrier and trim to proper length. Place excess material back in yellow bag and seal tightly with spare ties provided.

- Beginning at one end of the trench, hold product in place at finished grade level on the side of the trench adjacent to the hardscape (opposite root source) and stake in position using pins provided. Use Caution when handling installation pins - they are sharp.

Pins should penetrate fabric between the nodules ~1/4" from the top edge of the fabric and at ~45 degree angle to the trench wall (see Fig. 3). Enough pins are provided to secure fabric every 2 feet. The top edge of the product must be at finished grade level for the entire length of the installation.



- Backfill and tamp firmly to eliminate soil settling. Wet soil, if necessary, to ensure proper soil compaction.

For more information on Biobarrier, or for technical assistance, call toll-free:

1-800-284-2780.

NOTE:

These guidelines treat a typical urban sidewalk application. Other installations such as property lines, building foundations, retaining walls, ornamental beds, septic systems, storm drains, etc. may require minor procedural adjustments.

BIOBARRIER[®]

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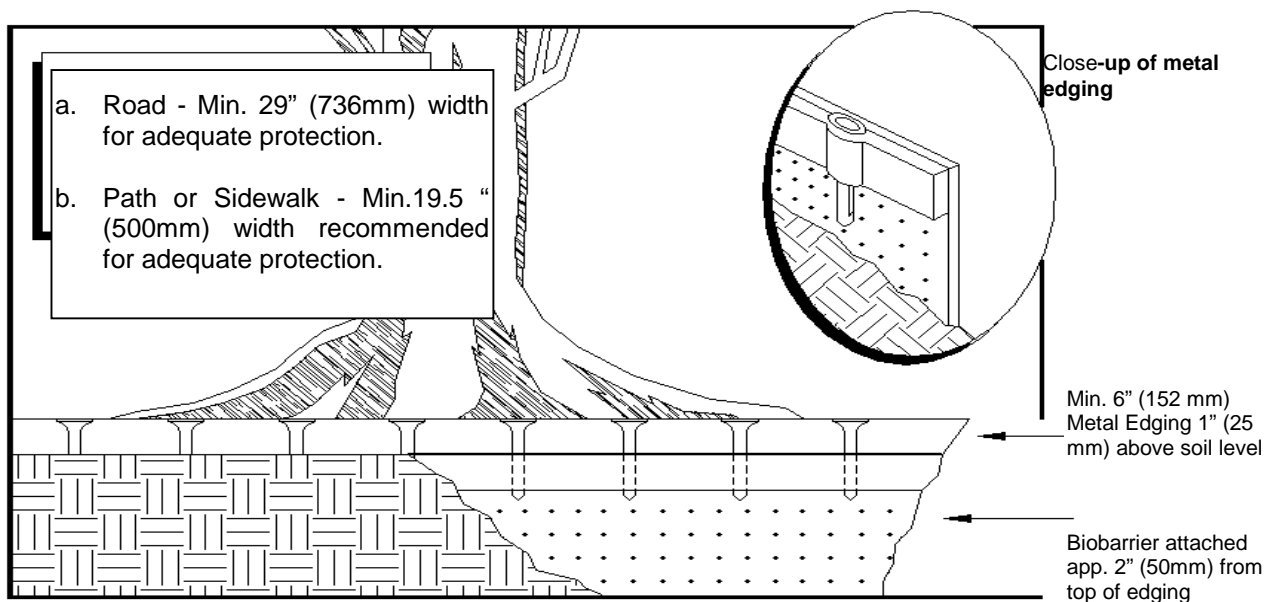
SPECIAL INSTALLATION INSTRUCTIONS (for unusual situations)

When two or more of the following conditions exist, special precautions, detailed below, should be followed for maximum prevention of root overgrowth of fabric.

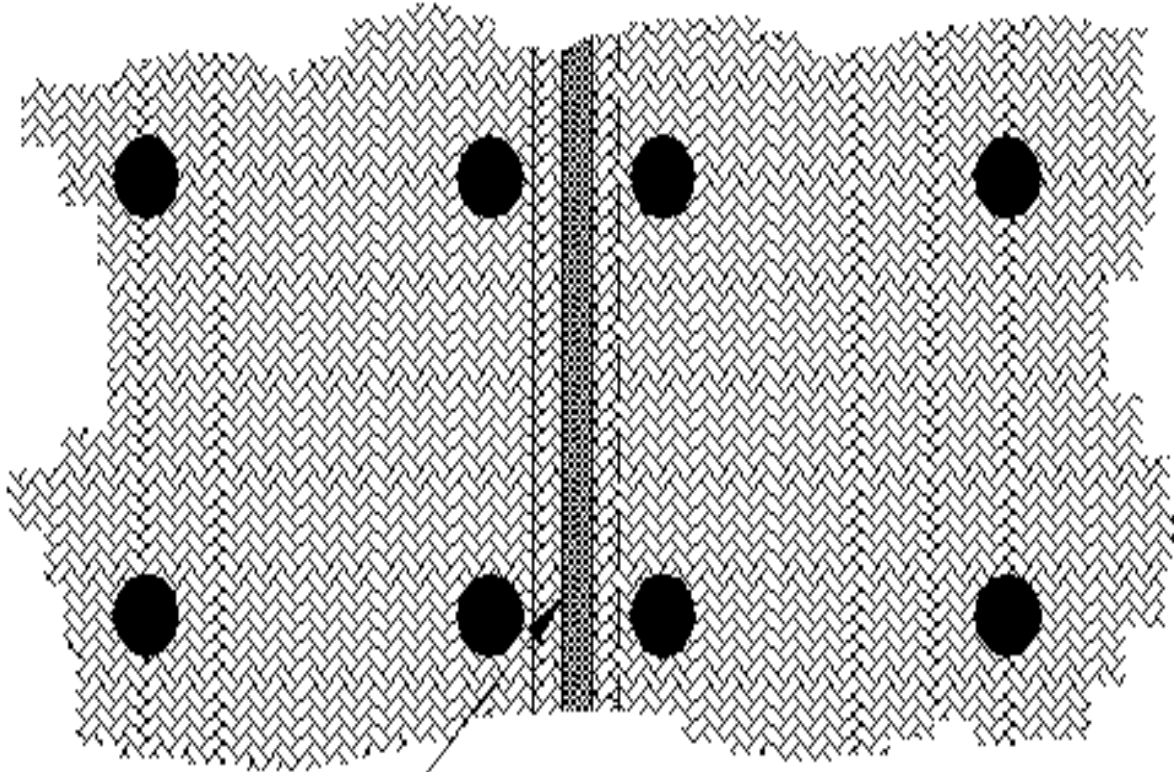
1. Base of potential problem tree is higher than protected hardscape
2. Soil is over 90% sand
3. Tree species is aggressive, top rooting variety such as maple, ficus, etc. Consult a local arborist for species questions or recommendations if necessary.
4. Tree is closer than eight feet (2400mm) from edge of protected hardscape.

Special Precautions (See Drawing Below)

1. Wherever practical, build level of soil adjacent to protected hardscape to a level even with or above base of tree.
2. Attach Biobarrier approximately two inches (50 mm) from the top edge of commercially available metal edging using hot or cold adhesive. For hot application use general adhesives hot melt #64x884 or equivalent. For cold applications use Macco, Liquid Nails Heavy-Duty adhesive LN-901 or equivalent.
3. Install metal edging adjacent to protected hardscape with Biobarrier attached. Leave metal edging approximately one inch above grade to prevent root overgrowth. Landscape timbers with Biobarrier attached to the bottom may be substituted for edging.



Biobarrier® Seaming Instructions



Continuous 6mm Wide Bead



3" (75mm) Min. Overlap At Ends

Hot Application

General Adhesive Co. Hot Melt #64 x 884 Or Equivalent

Cold Application

Macco Adhesives Liquid Nails Heavy-Duty Adhesive LN-901
Or Equivalent

See Detailed Instructions Attached for These Installation Types

This chart is a general guide only. Your specific applications may require slightly different sizes.

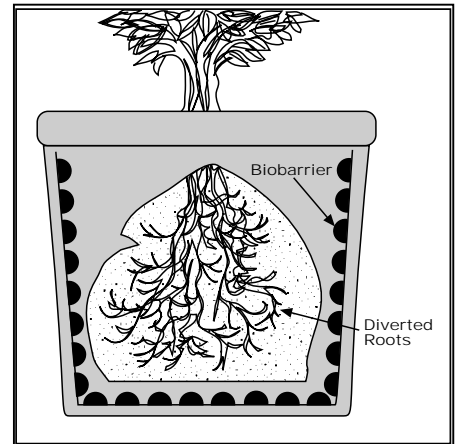
Application	Pg. #	Biobarrier® Recommended Depth				
		12.0" (30 cm)	19.5" (50 cm)	29.0" (74 cm)	39.0" (99 cm)	58.5" (149 cm)
Bunkers	12		•	•		
Canals	11					•
Containers	10			•	•	•
Curbs	15		•			
Dikes	11					•
Drain Lines	10	•	•	•	•	•
Earth-Filled Dams	11					•
Foundations	11			•	•	•
Golf Greens	12			•	•	
Landfills	12					•
Medians	15		•	•		
Pipes	10	•	•	•	•	•
Planting Beds	13		•	•	•	•
Pot 'N Pot	13	Sold In	6" x 12"	Swatches		
Pots	13	•	•			
Retaining Walls	14				•	•
Roof Gardens	13				•	•
Septic Tanks	14					•
Sidewalks	15		•	•		
Paths	15		•	•		
Streets	15		•	•		
Swimming Pools	15		•	•	•	
Tennis Courts	15		•	•	•	
Underground Storage Tanks	16					•
Utility Lines	10			•	•	•
Vaults	16					•

Containers

Line planting container with Biobarrier®, placing material vertically at finished grade level, allowing it to drape down side, across bottom and up opposite side, ending at finished grade level. Pins or tape can be used to hold material in place. Depending on container size, it may be necessary to seam two or more widths together (see page 8).

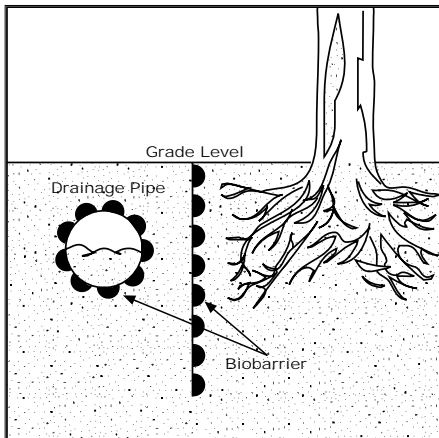
If container has a dirt bottom and roots are permitted to grow downward, product may be placed only around sides of container, attaching at top finished grade level. Width of product should be equal to, or greater than, the depth of container.

Biobarrier® is used in planting pots to prevent roots from growing through drain holes. The bottom of the pot should be covered with drainage medium, and then covered with Biobarrier®, permitting water to pass, but stopping roots.



Refer to General Guidelines, Page 5

Drain Lines, Utility Lines & Pipes

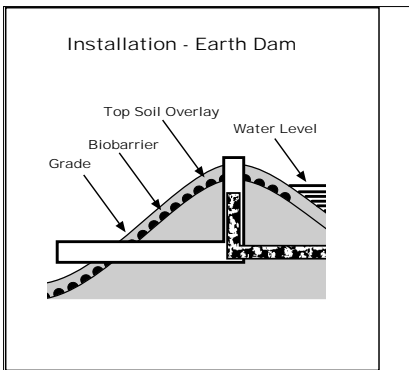


Drain lines and systems and utility lines and pipes can be protected from root intrusion by wrapping entirely with Biobarrier®, at joints or on any or all sides. Biobarrier® fabric can be easily cut with a knife or scissors to fit any configuration. Pipes may be completely wrapped lengthwise and overlapped (minimum of 3 inches or 2 nodules) or at joints or other critical locations where moisture or air may attract roots. Pins, industrial tape or adhesives, or plastic or metal bands may be used to hold Biobarrier® in

position...remember, no gaps, it is only effective "where it is."

Refer to General Guidelines (Pg.5) & Vertical Instructions (Pg. 6)

Earth Dams, Dikes, Canals

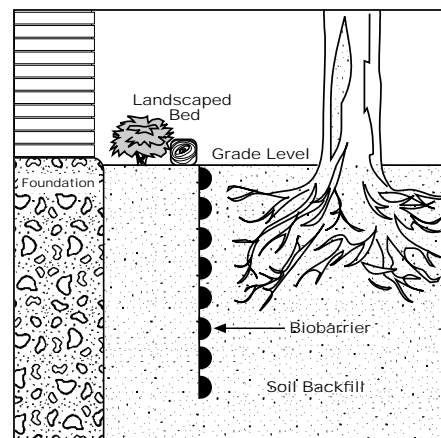


Biobarrier® can be used to prevent root intrusion into earth-filled structures and drain systems associated with dams, dikes and canals. For large areas, lengths of Biobarrier® can be seamed together using hot or cold melt adhesives (see Seaming Instructions, page 8). Pinned, overlapped seams can also be used. Biobarrier® is then placed over the area to be protected and covered to any depth with fill or other cover material, which can then 'naturalize' with surface vegetation without fear of tree root intrusion. Biobarrier® can be used underneath canals to prevent root intrusion. Biobarrier® must not come in direct contact with surface water. There can be no gaps as the effective zone for stopping roots is 1 inch from the nodules. In new construction, it is advantageous to substitute Biobarrier® Root Control in place of most drainage fabrics since the geotextile in Biobarrier® is a standard AASHTO drainage fabric.

Refer to General Guidelines, Page 5

Foundations

Dig a trench where Biobarrier® is to be installed, pruning the roots of existing trees if necessary. Distance of trench from foundation should be sufficient to allow for roots to swell without compromising structure. Place Biobarrier® in the trench, securing with pins provided. Backfill the trench, and compact the dirt to ensure there are no gaps and Biobarrier® is up to finished grade.

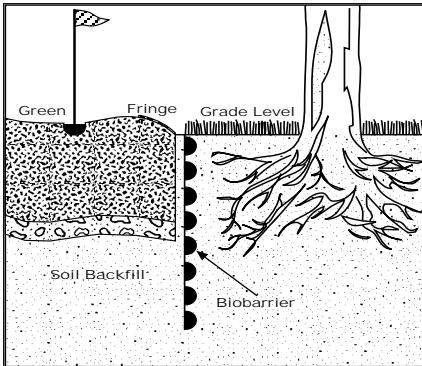


Refer to General Guidelines (Pg.5) & Vertical

Instructions (Pg.6)

Golf Greens/Bunkers

Dig a clean trench (extending to depth below existing roots) where Biobarrier® is to be installed. Remove roots on both sides of trench. Place top edge of Biobarrier® at finished grade level, securing with pins provided, insuring that product hangs straight and taut, with no slumping or gapping. Backfill, compacting soil firmly. Biobarrier® may need to go deeper under these ideal growing conditions.

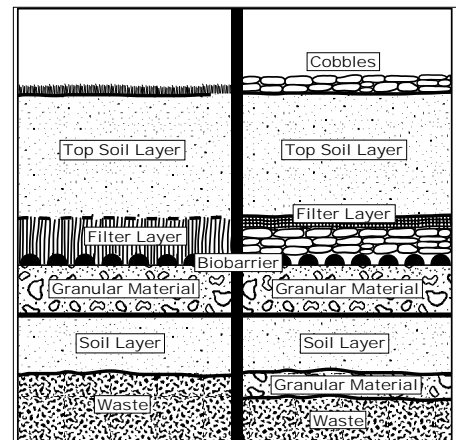


Backfill, compacting soil firmly. Biobarrier® may need to go deeper under these ideal growing conditions.

Refer to General Guidelines (Pg.5) & Vertical Instructions (Pg. 6)

Landfills

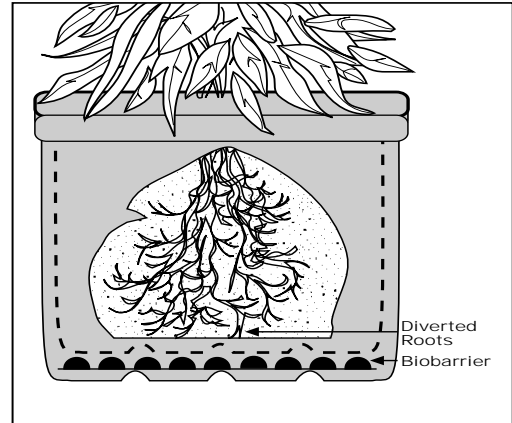
This application usually requires seaming or overlapping and/or hold down pins (see Seaming Instructions, page 8). If seaming is not feasible, then edges of fabric must be overlapped at least 3 inches (or 2 nodules) and secured with pins in order to assure a continuous root control plane after cover is applied. There can be no gaps as the effective zone for stopping roots is 1 inch from the nodules. In new construction, it is advantageous to substitute Biobarrier® Root Control in place of most drainage fabrics since the geotextile in Biobarrier® is a standard AASHTO drainage fabric.



Refer to General Guidelines (Pg. 5) & Vertical Instructions (Pg. 6)

Pot 'N Pot

Place the socket pot of the two-pot system designed to make an airtight seal, in the ground. Cover the bottom of the socket pot with Biobarrier®: normally a 32 nodule pad or two 32 nodule pads for ~15 gallon containers, in the bottom of the socket pot. Do not add other material that might obstruct the seal in the bottom of the pot. Place the grower tub pot inside the socket pot, turning the drain holes 90° to misalign holes. After the grower tub pots have been removed, collect the Biobarrier® patches and store in the plastic protective pouch

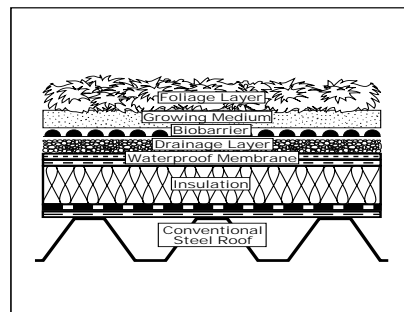


until next season for a maximum life expectancy of 10 years.

Refer to General Guidelines, Page 5

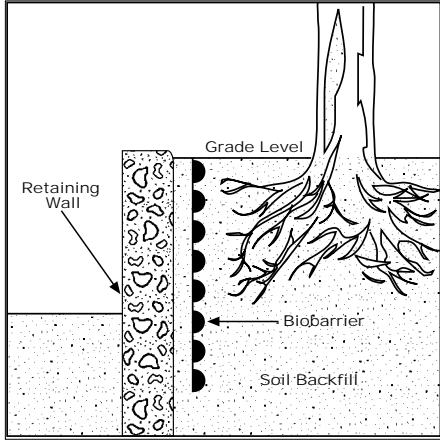
Planting Beds/Pots/Roofs/Gardens

Biobarrier® can be used to line containerized beds to prevent roots from growing into them, clogging the drain systems or breaking planter walls. Biobarrier® should completely cover the drainage medium (plus at least 1 inch up all sides) in the bottom of the planting bed, then adequate soil, potting mix, mulch, etc. should be added to sustain desired plant growth. Growth will not be inhibited until roots enter the Biobarrier® zone, approximately 1" above fabric. Careful selection of plant material is needed in this application. Biobarrier® is used in planting pots to prevent roots from growing through drain holes. The bottom of the pot should be covered with drainage medium then the medium completely covered with Biobarrier®, permitting water to pass, but stopping roots. Biobarrier® can be used as the drainage fabric between the growing medium and the drainage medium in almost any application to prevent root intrusion into the drainage system. Roof gardens require site-specific custom designs, however, the above sketch is typical.



Roof gardens require site-specific custom designs, however, the above sketch is typical.

Refer to General Guidelines, Page 5



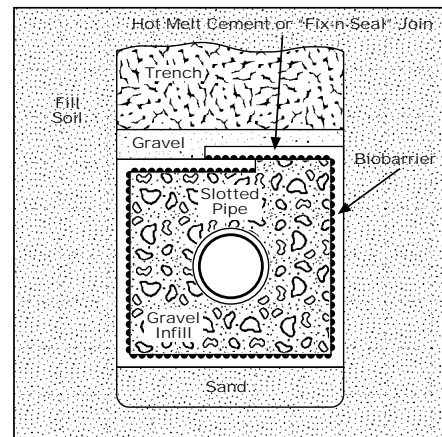
Retaining Walls

Dig a trench 1" deeper than chosen material width where Biobarrier® is to be installed. Prune and remove the roots of existing trees. Place Biobarrier® in the trench at finished grade level, securing with pins provided. Backfill the trench, compacting the dirt to ensure there are no gaps. If possible, trench should be cut at least 1 foot from retaining wall to allow for future root swell.

Refer to General Guidelines (Pg. 5) & Vertical Instructions (Pg. 6)

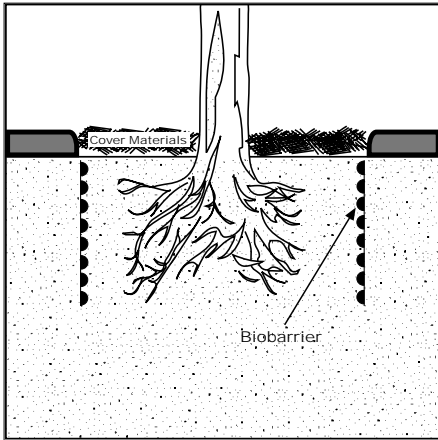
Trench Drains & Septic Tanks

Completely surround the trench or tank and stone with Biobarrier® and/or overlap seam. The geotextile drainage fabric also serves to maintain the separation between the soil and the stone. Cutouts for inflow and outflow pipe penetrations should fit snugly around pipes. Wrap each pipe cutout and junction with Biobarrier®, then secure with industrial tape or ties. Leave no gaps in the Biobarrier®.



Refer to General Guidelines, Page 5

Sidewalks/Paths/Streets/Curbs/Medians/Tennis Courts

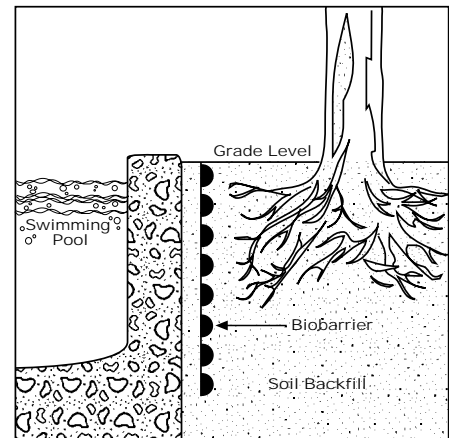


Dig a trench adjacent to hardscape (as close as possible) insuring depth is below where existing roots are found. After trenching, remove remaining roots, leaving walls of trench smooth. Place top edge of Biobarrier® at finished grade level, securing with pins provided. Backfill carefully to avoid dislocating Biobarrier®, and compact firmly.

Refer to General Guidelines (Pg. 5) & Vertical Instructions (Pg. 6)

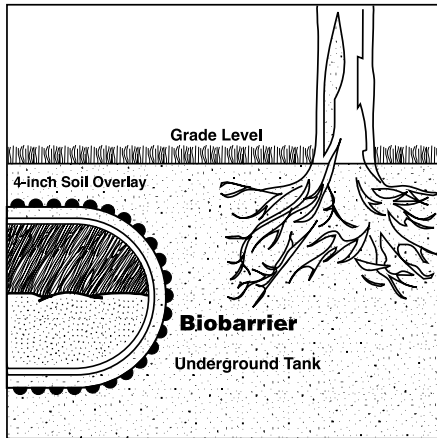
Swimming Pools

Dig a trench adjacent to hardscape, pruning and removing any existing roots, leaving trench clean. Place Biobarrier® at finished grade level, securing with pins provided. Backfill the trench, compacting the dirt firmly to ensure there are no gaps. If possible, trench should be cut at least 1 foot from pool edge to allow for future root swell.



Refer to General Guidelines (Pg. 5) & Vertical Instructions (Pg. 6)

Underground Tanks, Vaults



Underground tanks may be protected from root intrusion by placing Biobarrier® across the top and securing to the sides of the tank before backfilling. Biobarrier® may also be placed on the sides and/or bottom of the tank. If a drainage system is provided around the tank, Biobarrier® may be used as the drainage fabric as well as to prevent root intrusion. Site-specific design is required.

Refer to General Guidelines, Page 5

Biobarrier® II Preemergence Weed Control

Horizontal Weed Control Installation Instructions For:

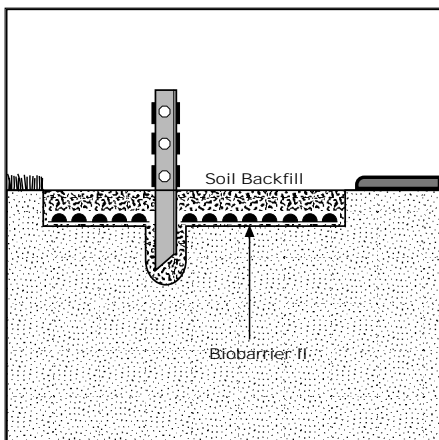
- **Guardrails & Fence Rows**
- **Street Medians, Landscaping, Tombstones**
- **Tree Skirts**
- **Utility Substations**
- **Pavers**

Guardrails and Fence Rows

Determine width of weed inhibition desired. Remove existing soil or plant material to a depth of 2 inches below grade. A one-time application of a systemic herbicide will help control growth until Biobarrier® II herbicide zone is completely established (~ two weeks). Cut Biobarrier® II lengthwise and fit by cutting 'x' shaped slits around rails or posts. Fabric must fit snugly around rail or post to prevent weeds from growing up between it and the Biobarrier® II. Secure Biobarrier® II with pins (provided), and then add 2 inches of cover material. Rock or mulch are the preferred choices, however, soil, cinders or recycled shredded or chipped rubber may be used. In new installations, place Biobarrier® II in width desired, place cover material, and install guardrail posts or fence posts through the fabric.

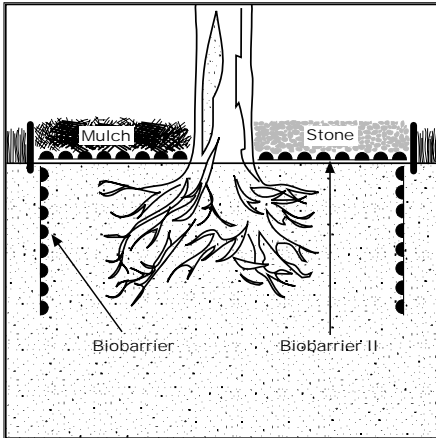
Be sure to maintain the cover as UV and heat significantly reduce the life of Biobarrier.

Refer To Biobarrier® II General Landscaping Installation Instructions (Page 21) and Page 5 General Installation Guidelines



Street Medians, Landscaping, Tombstones

(Combination Application)



Since this application also utilizes Biobarrier® Root Control, see pages 5, 6 and 7.

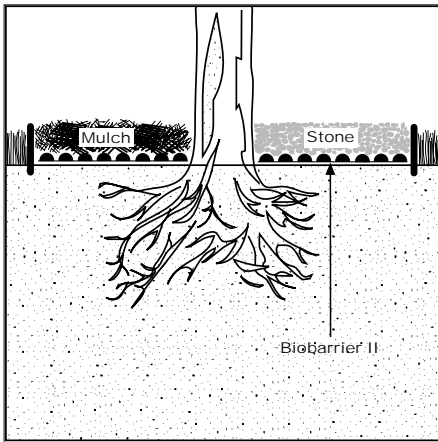
Remove unwanted vegetation and material to a depth of 2 inches below grade. A one-time application of a systemic herbicide will help contain growth until the Biobarrier® II herbicide zone is completely established (~ two weeks). Position and cut fabric for existing or new plants. Cut 'x' for plants with scissors or knife. Fit fabric around plant, folding

flaps up close to each plant. Secure fabric edges by cutting a shallow trench (>1 inch) and 'toeing in' exposed edge of Biobarrier® II. Pin fabric edge in trench at least every 4 ft. Add width, if required, by overlapping fabric 3 inches (75mm) and pinning in place. Add 2 inches (50 mm) of cover material. Plant roots will not grow in 1 to 2 inch zone next to Biobarrier® II, so plants should be selected considering their normal root depth. The 2 inches of cover material must be maintained over Biobarrier II for long-term effectiveness.

Refer To Biobarrier® II General Landscaping Installation Instructions (Pg. 21) and Pages 5, 6 and 7

Tree Skirts

Determine size of area where surface vegetation is to be controlled. Cut a narrow trench with the edge of a shovel in desired shape. With scissors or knife, cut Biobarrier®II on line indicated, through the center point, extending slits as necessary to permit fabric to fit snugly around tree trunk. Fold 'points' of fabric under. Bring cut skirt edges together, securing with landscape pins



(provided in package). With tip of shovel, make 1"- 2" cuts in soil slightly back from edge of Biobarrier®II, and then tuck fabric edge in. Pins should then be placed every foot around edge of skirt to prevent it being pulled up by mowing equipment.

A rigid retainer around the tree can keep cover material in place and aid in keeping the edges of the Biobarrier®II material in the narrow 'toe-in' trench.

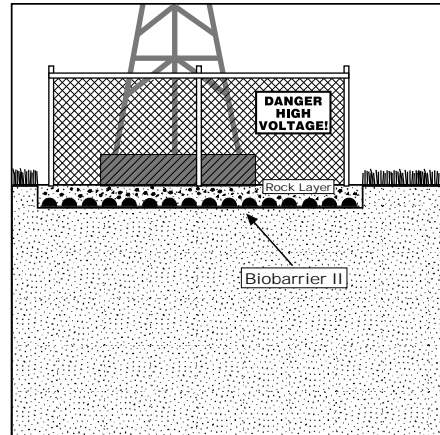
Cover Biobarrier®II tree skirt with 2" of stone, mulch or soil. This depth must be maintained for optimum effectiveness. Deeper cover will permit more root growth for a longer period. However, if a seed does germinate, even in the 2" layer, when it attempts to grow down to set up a viable root system, it will come in contact with the herbicide zone and cease growing. Exposure of Biobarrier®II to sunlight will result in less than guaranteed life. Keep it covered.

Refer To Page 5 General Installation Instructions and Biobarrier® II General Landscaping Installation Instructions (Page 21)

Utility Substations

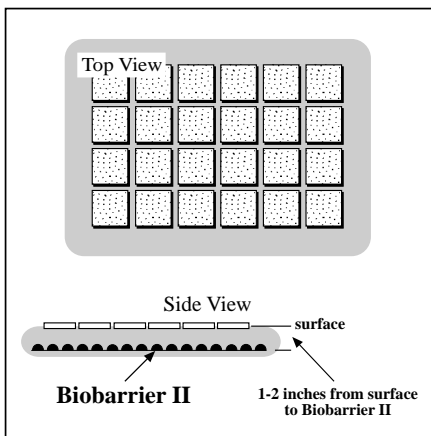
Remove existing soil or plant material to a depth of 2 inches below grade. A one-time application of a systemic herbicide will help contain growth until Biobarrier® II herbicide zone is completely established (~ two weeks).

Place Biobarrier® II, overlapping or seaming according to seaming instructions (page 8) until desired width is achieved. Extend Biobarrier® II 18 inches beyond fence line for maximum benefit. Place 2 inches of cover material on the fabric. The objective is to prevent UV exposure and heat from degrading the Biobarrier® II. At least 2 inches of cover material must be maintained to obtain normal life expectancy.



Refer To Page 5 General Installation Instructions and Biobarrier® II General Landscaping Installation Instructions (Page 21)

Pavers



Excavate 2" below grade level, removing unwanted vegetation (especially that which could puncture fabric). Apply a systemic herbicide to prevent re-growth, if desired.

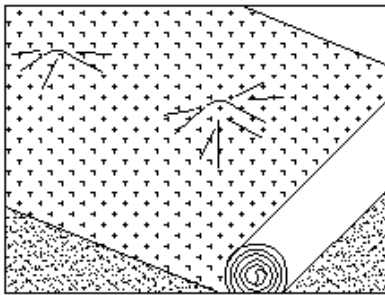
Place Biobarrier® II horizontally, securing edges by "toeing in" to a shallow trench, then anchoring with landscape pins (included). Layer 1" to 2" of sand on top of Biobarrier II, position pavers in desired pattern and level.

Refer To Page 5 General Installation Instructions and

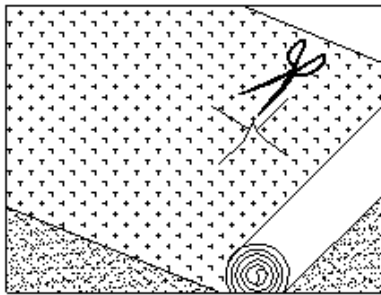
Biobarrier® II General Landscaping Installation Instructions (Page21)

BIOBARRIER® II WEED CONTROL INSTALLATION (General Landscaping)

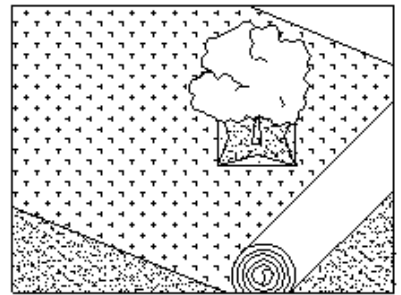
1. Remove unwanted vegetation (particularly green foliage) and materials that can puncture the fabric.
2. Wear chemical resistant gloves & eye protection; avoid contact with skin and clothing to prevent staining.
3. Open the sealed yellow barrier wrap. Install product and cover as soon as possible (within 12 hours). High temperatures and direct sunlight will reduce effective life. Place unused material in the barrier wrap and seal with ties provided.
4. Position and cut fabric for existing or new plants. Add width, if required, and secure in place with landscape pins provided (see illustrations A through F):



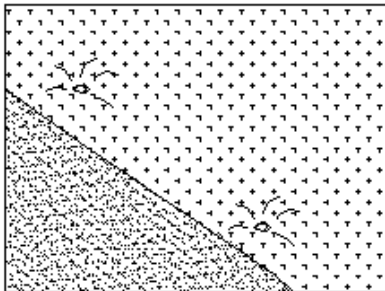
A. Simply roll fabric out gently over existing plants.



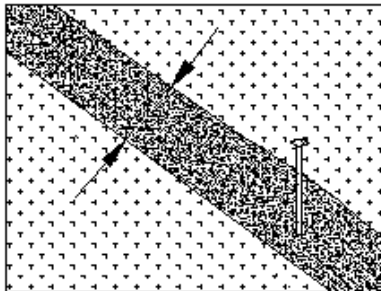
B. Cut "X" above each plant with household scissors or knife forming triangular flaps.



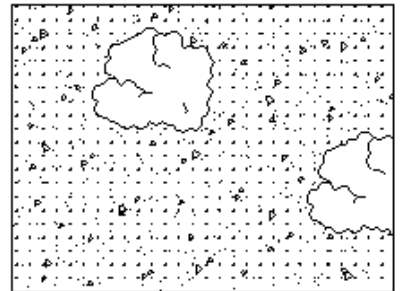
C. Fit fabric around each plant. Fold back flaps against each plant



D. Secure fabric edges by cutting a shallow trench (approx. 1") & 'toeing in' edge of Biobarrier into trench. Peg fabric edge in trench every 4'



E. Add width if required by overlapping fabric three inches (75 mm) and staking in place.



F. Cover fabric with 2 inches (50 mm) of material.

Ensure a two-inch (50 mm) cover material depth is maintained.

These guidelines treat a typical installation for surface vegetation control.

Minor procedural changes may be required depending on your specific application.

**Precautionary Statements
Hazards to Humans and
Domestic Animals**

CAUTION

May cause moderate eye irritation. Harmful if inhaled, or absorbed through the skin. Do not get in eyes, on skin or on clothing. The active ingredient, trifluralin, may cause skin sensitization reactions in certain individuals.

Use protective clothing such as long pants, long-sleeved shirt, and chemical resistant gloves when handling this product. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

**USER SAFETY
RECOMMENDATIONS**

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If swallowed:

- Call a poison control center or doctor immediately for treatment.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by a poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

If in eyes:

- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye.
- Call poison control center or doctor for treatment advice.

If on skin or clothing:

- Take off contaminated clothing.
 - Rinse skin immediately with plenty of water for 15-20 minutes.
 - Call poison control center or doctor for treatment advice.
- If inhaled:
- Move person to fresh air.
 - If person is not breathing, call 911 or ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.
 - Call poison control center or doctor for treatment advice.
 - Have the product container label with you when calling a poison control center or doctor, or going for treatment.

Environmental Hazards:

This pesticide is extremely toxic to freshwater, marine, and estuarine fish and aquatic invertebrates including shrimp and oyster. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical Hazards:

Do not store near heat or open flame.

Directions for Use:

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

Storage: Store in original container only. Store in dry place out of direct sunlight.

Pesticide Disposal: Do not contaminate water, food, or feed by storage or disposal. Wastes resulting from use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Completely empty container. Then dispose of wrap and/or box in a sanitary landfill or by incineration, or, if allowed by State and Local authorities, by burning. If burned, stay out of smoke.

General Directions:

Biobarrier® is a multi-year root control system which is strategically positioned in the soil to protect structures from plant root encroachment (see applications). Biobarrier controls roots by establishing an in-soil barrier plane of trifluralin, which prevents root tip cell division. Roots are either stopped or redirected away from structures. Trifluralin is not systemic but can limit root mass. The multi-year feature of Biobarrier is provided by a time-release mechanism which continues to meter trifluralin into the soil as the exposed trifluralin biologically and chemically degrades. Structure protection is provided by placing the Biobarrier fabric between the root source and the structure. Since the fabric is flexible and permeable, installation may be custom contoured to obtain the most desirable root system redirection for the application and/or to accommodate obstacles.

**Bio>barrier®
Root Control System**

Biobarrier is a multi-year root control system consisting of time-release nodules impregnated with a herbicide. The nodules are attached permanently to a flexible and permeable geotextile fabric which can be contour applied to a wide variety of applications and which will inhibit plant root development in the applications set forth below.

Active Ingredient:

Trifluralin (α,α,α-trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine).....	<u>Nominal</u> 17.5%
Inert Ingredients:.....	82.5%
TOTAL.....	100.0%

**KEEP OUT OF REACH
OF CHILDREN**

CAUTION

**See side panel for additional
Precautionary Statements.**

Mfg. By:



70 Old Hickory Blvd.
Old Hickory, TN 37138
1-800-257-6687

EPA Registration No. 59823-1
Establishment No. 59823-TN-1

Installation Directions:

Biobarrier® is ready for in-soil installation as received. The fabric should be in soil as soon as practical after removal from the sealed shipping container, minimizing exposure to direct sunlight and elevated temperatures. Prolonged exposure can reduce the effective life of the product. Biobarrier® should not be installed in water. Store any unused portions of the product tightly resealed in the original container in a dry place.

Biobarrier can be installed in the soil vertically, horizontally, or as a surround. Vertical applications typically require standard ditch/trench digging equipment (follow all applicable codes when digging below surface). Vertical fabric position can be maintained by suspending it at the top with pegs. Horizontal applications may require seaming or hold down pegs. Surround applications may involve a variety of holding devices to assure fabric position. In all applications, nodules must be no further than one and one-half inches apart in order to assure a continuous root control plane. Fabric should extend a minimum of 18" beyond structure area to be protected as roots can grow around edges of fabric. For vertical applications, the top edge must be even with the soil surface. A minimum of 2" soil overlay should also be maintained for horizontal applications.

Biobarrier, used in retrofit applications where roots are already present, requires roots be interrupted with a root pruner or equivalent device and removed. Root control will not be effective if roots penetrate fabric at time of installation.

**(SEE ADDITIONAL DIRECTIONS
ENCLOSED)**

Disclaimer of Warranties

The Seller makes no warranties concerning this product or its use which extend beyond the standard specifications for the products. **The Seller makes no warranties of merchantability or fitness for a particular purpose, or any other express or implied warranty.**

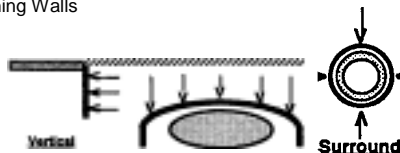
Buyer assumes all risk and liability resulting from use of the products delivered hereunder, whether used singularly or in combination with other products. All statements concerning this product apply only when used as directed.

Limitation of Damages

No claim of any kind, whether as to products delivered or for nondelivery of products, and whether or not based on negligence, shall be greater in amount than the purchase price of the products in respect to which damages are claimed. No charge or expense incident to any claims will be allowed unless approved by an authorized representative of Seller. Products shall not be returned to seller without Seller's prior permission, and then only in a manner prescribed by Seller. **The remedy hereby provided shall be the exclusive and sole remedy of Buyer, and in no event shall either party be liable for special, indirect or consequential damages, whether or not caused by or resulting from the negligence of such party.**

Biobarrier Applications

- | | |
|-----------------------------|--------------------------------|
| Bicycle Paths | Roads |
| Building Foundations | Roof Gardens |
| Burial Vaults/Tombstones | Septic Tanks/Fields |
| Curbs | Sidewalks |
| Earthdams | Swimming Pools |
| Golf Greens/Tees/Cart paths | Tennis Courts |
| Landfills | Underground Pipes/
& Cables |
| Medians | Utility Substations |
| Planting Beds/Containers | |
| Retaining Walls | |



horizontal

Non-Food/Ornamentals

**Precautionary Statements
Hazards to Humans and
Domestic Animals**

CAUTION

May cause moderate eye irritation. Harmful if inhaled, or absorbed through the skin. Do not get in eyes, on skin or on clothing. The active ingredient, trifluralin, may cause skin sensitization reactions in certain individuals.

First Aid:

If swallowed:

- Call a poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by a poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

If in eyes:

- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a poison control center or doctor for treatment advice.

If on skin or clothing:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

If inhaled:

- Move person to fresh air.
- If person is not breathing, call 911 or ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.
- Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

Personal Protective Equipment:

Applicators and all other handlers must wear:

- Long-sleeved shirt and long pants
- Socks and shoes and
- Chemical resistant gloves

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Environmental Hazards:

This pesticide is extremely toxic to freshwater, marine, and estuarine fish and aquatic invertebrates including shrimp and oyster. Do not apply directly to water or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical Hazards:

Do not store near heat or open flame.



Pot 'N Pot

**Root Control System for Container Grown
Ornamentals**

Bio-barrier® is a multi-year root control system consisting of time-release nodules impregnated with a herbicide. The nodules are attached permanently to a flexible and permeable geotextile fabric.

Active Ingredient:

Trifluralin (α, α, α -trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine).....	<u>Nominal</u> 17.5%
Inert Ingredients:.....	82.5%
TOTAL.....	100.0%

**KEEP OUT OF REACH
OF CHILDREN**

CAUTION

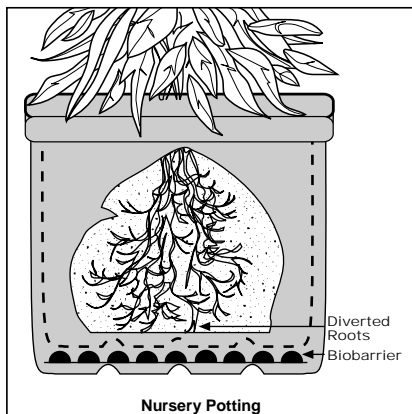
**See side panel for additional
Precautionary Statements.**

Mfg. By:



70 Old Hickory Blvd.
Old Hickory, TN 37138
1-800-257-6687

EPA Registration No. 59823-1
Establishment No. 59823-TN-1



Limitation of Damages

No claim of any kind, whether as to products delivered or for nondelivery of products, and whether or not based on negligence, shall be greater in amount than the purchase price of the products in respect to which damages are claimed. No charge or expense incident to any claims will be allowed unless approved by an authorized representative of Seller. Products shall not be returned to seller without Seller's prior permission, and then only in a manner prescribed by Seller. **The remedy hereby provided shall be the exclusive and sole remedy of Buyer, and in no event shall either party be liable for special, indirect or consequential damages, whether or not caused by or resulting from the negligence of such party.**

Directions for Use:

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

The Worker Protection Standard applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Do not apply this product in a way that will contact workers or other persons. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours. Exception: if the product is soil-incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter treated area if there will be no contact with anything that has been treated.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as soil is:

- coveralls
- chemical resistant gloves
- shoes plus socks

STORAGE AND DISPOSAL

Storage: Store in original container only. Store in dry place out of direct sunlight.

Pesticide Disposal: Do not contaminate water, food, or feed by storage or disposal. Wastes resulting from use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Completely empty container. Then dispose of wrap and/or box in a sanitary landfill or by incineration, or, if allowed by State and Local authorities, by burning. If burned, stay out of smoke.

General Directions:

Bio-barrier® Pot 'N Pot is for use in the production of ornamental plants grown in pots in nurseries, greenhouses, and shadehouses. For the Pot 'N Pot system of production, install Bio-barrier on the inside bottom of the larger pot and then insert the smaller pot containing the plants. Bio-barrier prevents roots from growing through the pot drain holes. With the use of Bio-barrier less labor is required for harvesting and less damage is caused to roots as plants are removed.

Disclaimer of Warranties

The Seller makes no warranties concerning this product or its use which extend beyond the standard specifications for the products. **The Seller makes no warranties of merchantability or fitness for a particular purpose, or any other express or implied warranty.**

Buyer assumes all risk and liability resulting from use of the products delivered hereunder, whether used singularly or in combination with other products. All statements concerning this product apply only when used as directed.

**USER SAFETY
RECOMMENDATIONS**

User Should:

Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

**Precautionary Statements
Hazards to Humans and
Domestic Animals**

CAUTION

May cause moderate eye irritation. Harmful if inhaled, or absorbed through the skin. Do not get in eyes, on skin or on clothing. The active ingredient, trifluralin, may cause skin sensitization reactions in certain individuals.

Use protective clothing such as long pants, long-sleeved shirt, and chemical resistant gloves when handling this product. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

**USER SAFETY
RECOMMENDATIONS**

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If swallowed:

- Call a poison control center or doctor immediately for treatment.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by a poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

If in eyes:

- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye.
- Call poison control center or doctor for treatment advice.

If on skin or clothing:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call poison control center or doctor for treatment advice.

If inhaled:

- Move person to fresh air.
- If person is not breathing, call 911 or ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.
- Call poison control center or doctor for treatment advice.
- Have the product container label with you when calling a poison control center or doctor, or going for treatment.

Environmental Hazards:

This pesticide is extremely toxic to freshwater, marine and estuarine fish and aquatic invertebrates including shrimp and oyster. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical Hazards:

Do not store near heat or open flame.

Directions for Use:

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

Storage: Store in original container only. Store in dry place out of direct sunlight.

Pesticide Disposal: Do not contaminate water, food, or feed by storage or disposal. Wastes resulting from use of this product may be disposed of on site or at an approved waste disposal facility. **Container Disposal:** Completely empty container. Then dispose of wrap and/or box in a sanitary landfill or by incineration, or, if allowed by State and Local authorities, by burning. If burned, stay out of smoke.

General Directions:

Biobarrier®II is a multi-year preemergence weed control system which is strategically positioned to inhibit root development and surface vegetation (see applications). Biobarrier II controls plant roots by establishing an in-soil barrier plane of trifluralin, which prevents root tip cell division. The multi-year feature of Biobarrier II is provided by a time-release mechanism which continues to meter trifluralin into the soil as the exposed trifluralin biologically and chemically degrades. Since the fabric is flexible and permeable, installation may be custom contoured to obtain the most desirable control.

**Biobarrier® II
Preemergence Weed Control System**

Biobarrier is a multi-year preemergence weed control system consisting of time-release nodules impregnated with a herbicide. The nodules are attached permanently to a flexible and permeable geotextile fabric which can be contour applied to a wide variety of applications and which will inhibit plant root development in the applications set forth below.

Active Ingredient:

Nominal

Trifluralin (α,α,α -trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine).....
17.5%

Inert Ingredients:.....

**KEEP OUT OF REACH
OF CHILDREN**

CAUTION

**See side panel for additional
Precautionary Statements.**

Mfg. By:



70 Old Hickory Blvd.
Old Hickory, TN 37138
1-800-257-6687

EPA Registration No. 59823-3
Establishment No. 59823-TN-1

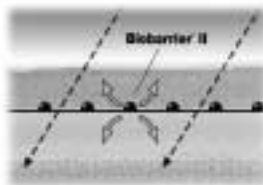
Biobarrier II Applications

May be installed in any area of the landscape which normally requires spraying or weed trimming to control surface vegetation, as long as a 2" cover material is maintained.

Biobarrier® II is not to be installed in surface water. (See Environmental Hazards)

Specific applications include:

- Guardrails
- Fence Rows
- Street Medians
- Landscaping
- Tombstones
- Tree Skirts
- Utility Substations
- Pavers



Non-Food Use Only

Installation Directions:

Biobarrier®II is ready for in-soil installation as received. The fabric should be in soil as soon as practical after removal from the sealed shipping container, minimizing exposure to direct sunlight and elevated temperatures. Prolonged exposure can reduce the effective life of the product. Biobarrier®II should not be installed in water. Store any unused portions of the product tightly resealed in the original container in a dry place.

Biobarrier® II is installed in the soil horizontally to control surface vegetation. Product may require seaming, hold down pegs, or other devices to assure fabric position. In all applications, nodules must be no further than one and one-half inches apart in order to assure a continuous root control plane. A 2" layer of cover material must be maintained.

**(SEE ADDITIONAL DIRECTIONS
ENCLOSED)**

Disclaimer of Warranties

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Buyer assumes all risk and liability resulting from use of the products delivered hereunder, whether used singularly or in combination with other products. All statements concerning this product apply only when used as directed.

Limitation of Damages

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Specification-Root Control

1. SCOPE

- 1.1. This is a materials specification covering root control barrier in trenches, alongside hardscape structures such as sidewalks, curbing, pavements, concrete and building foundations to prevent structural damage due to root penetration. The product functions to provide both a physical and chemical barrier zone to restrict vegetative root encroachment.
- 1.2. This is a material purchasing specification and design review of its use is recommended.

2. REFERENCED DOCUMENTS

2.1. *ASTM Standards

D-5261	Test Method for Measuring Mass per Unit Area of Geotextiles
D-4632	Test Method for Grab Breaking Load and Elongation of Geotextiles
D-4833	Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
D-4533	Test Method for Trapezoid Tear Strength of Geotextiles
D-4491	Test Method for Water Permeability of Geotextiles by Permittivity
D-4751	Test Method for Determining the Apparent Opening Size of a Geotextile
D-4355	Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)

2.2. *EPA Standards (Reference EPA Label) Registration No. 59823-1 (Attached Exhibit B)

EPA	CG	1500	Water Solubility
EPA	CG	1600	Vapor Pressure

3. PHYSICAL AND CHEMICAL REQUIREMENTS

- 3.1. Fibers used in the manufacture of root control barrier substrate fabric shall consist of long chain synthetic polyolefins (at least 95% by weight) and a UV stabilizer. They shall be formed into a stable network such that the filaments or yarns retain their dimensional stability relative to each other.
- 3.2. Nodules consisting of trifluralin, carbon black, and polyethylene compounded in a patented method utilizing time-released characteristics are permanently attached to the substrate fabric on 1-1/2" centers by a through injection molding process.
- 3.3. All substrate property values, with the exception of apparent opening size (AOS), in these specifications represent minimum average roll values (MARV) in the weakest principal direction (i.e., average test results of any roll in a lot sampled for conformance or quality assurance testing shall meet or exceed the minimum values provided herein). Values for AOS represent maximum average roll values.
- 3.4. Property values for the trifluralin are average run values.

4. CERTIFICATION

- 4.1. The Manufacturer shall provide to the Engineer a certificate stating the name, product name, style number, chemical composition and other pertinent information to fully describe the product. The Manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available upon request.

- 4.2. The Manufacturer's certificate shall state that the root control product meets requirements of the specification as evaluated under the Manufacturer's quality control program. The certificate shall be attested to by a person having legal authority to bind the Manufacturer.
- 4.3. Either mislabeling or misrepresentation of materials shall be reason to reject those products.

5. SAMPLING, TESTING, AND ACCEPTANCE

- 5.1. Root control substrate product shall be subject to sampling and testing to verify conformance with this specification. Acceptance shall be based on manufacturer's certifications.
- 5.2. Testing shall be performed in accordance with the methods referenced in this specification for the indicated application. The number of specimens to test per sample is specified by each test method.

6. SHIPMENTS AND STORAGE

- 6.1 Product labels shall clearly show the manufacturer or supplier name, style number, and roll number and shall include a compliance statement certifying that all ingredients and inspection standards for this product have been met.
- 6.2 Each root control product roll shall be wrapped with a protective EVOH bag and placed in a box that will protect the product from damage due to shipment, water, sunlight, and contaminants and to prevent premature release of herbicide. The protective wrapping shall be maintained during periods of shipment and storage.
- 6.3 During storage, root control product shall be elevated off the ground and out of direct sunlight. It shall remain sealed in EVOH protective bag inside shipping box at a temperature of not more than 110°F.

6. PRODUCT DESCRIPTION

Overall Product Major Composition and Ingredients		Typical
Active Chemical*: 17.5%	Trifluralin (a,a,a-Trifluoro 2,6 - dinitro - N,N, - Dipropyl - p - toluidine)	
Inert Ingredients: 82.5%	100% Spunbonded Polypropylene, Polyethylene and Carbon	

Trifluralin Characteristics	Typical Values		Test
	English	Metric	
Method*			
Vapor pressure (mm Hg @ 25 ° C)	1x10-4	1x10-4	EPA CG 1600
Solubility in Water (ppm @ 25 ° C)	<0.3	<0.3	EPA CG 1500
Fabric Properties	Minimum Values		Test Method*
	English	Metric	
Unit Weight	3.9 oz/yd ²	130 g/m ²	ASTM D-5261
Grab Tensile Strength	130 lbs.	575 N	ASTM D-4632
Elongation at Break	60%	60%	ASTM D-4632
Puncture Strength	40lbs.	175 N	ASTM D-4833
Trap Tear	60lbs.	265 N	ASTM D-4533
Permittivity	0.7 sec.	0.7 sec.	ASTM D-4491
AOS (Max Value)	0.21 mm	0.21 mm	ASTM D-4751
Ultraviolet Stability	70% @ 500 hrs	70% @ 500 hrs	ASTM D-4355

*Test methods or revision numbers available on request (17.5% Average trifluralin in total composite, Min. of 20% trifluralin in nodules)

¹ Available from ASTM, 1916 Race Street, Philadelphia, PA

Specification-Weed Control

1. SCOPE

- 1.1 This is a materials specification covering pre-emergence weed control fabrics for use under guardrails along highways, under fences, around posts and signs, and in any other areas where surface weeds must be controlled by use of mechanical means or spraying. The product functions to provide both a physical and chemical barrier zone to prevent vegetative root encroachment, minimizing surface vegetation.
- 1.2 This is a material purchasing specification and design review of its use is recommended.

2. REFERENCED DOCUMENTS

2.1 *ASTM Standards

D-5261	Test Method for Measuring Mass per Unit Area of Geotextiles
D-4632	Test Method for Grab Breaking Load and Elongation of Geotextiles
D-4833	Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
D-4533	Test Method for Trapezoid Tear Strength of Geotextiles
D-4491	Test Method for Water Permeability of Geotextiles by Permittivity
D-4751	Test Method for Determining the Apparent Opening Size of a Geotextile
D-4355	Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)

2.2 *EPA Standards (Reference EPA Label) Registration No. 59823-1

EPA	CG	1500	Water Solubility
EPA	CG	1600	Vapor Pressure

3. PHYSICAL AND CHEMICAL REQUIREMENTS

- 3.1 Fibers used in the manufacture of pre-emergence weed control substrate fabric shall consist of long chain synthetic polyolefins (at least 95% by weight) and a UV stabilizer. They shall be formed into a stable network such that the filaments or yarns retain their dimensional stability relative to each other.
- 3.2 Nodules consisting of trifluralin, carbon black, and polyethylene compounded in a patented method utilizing time-released characteristics are permanently attached to the substrate fabric on 1-1/2" centers by a through injection molding process.
- 3.3 All substrate property values, with the exception of apparent opening size (AOS), in these specifications represent minimum average roll values (MARV) in the weakest principal direction (i.e., average test results of any roll in a lot sampled for conformance or quality assurance testing shall meet or exceed the minimum values provided herein). Values for AOS represent maximum average roll values.
- 3.4 Property values for the trifluralin are average run values.

4. CERTIFICATION

- 4.1 The Manufacturer shall provide to the Engineer a certificate stating the name, product name, style number, chemical composition and other pertinent information to fully describe the product.
- 4.2 The Manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available upon request.

4.3 The Manufacturer's certificate shall state that the preemergence weed control product meets requirements of the specification as evaluated under the Manufacturer's quality control program. The certificate shall be attested to by a person having legal authority to bind the Manufacturer.

4.4 Either mislabeling or misrepresentation of materials shall be reason to reject those products.

5. SAMPLING, TESTING, AND ACCEPTANCE

5.1 Preemergence weed control substrate product shall be subject to sampling and testing to verify conformance with this specification. Acceptance shall be based on manufacturer's certifications.

5.2 Testing shall be performed in accordance with the methods referenced in this specification for the indicated application. The number of specimens to test per sample is specified by each test method.

6. SHIPMENTS AND STORAGE

6.1 Product labels shall clearly show the manufacturer or supplier name, style number, and roll number and shall include a compliance statement certifying that all ingredients and inspection standards for this product have been met.

6.2 Each preemergence weed control product roll shall be wrapped with a protective EVOH bag and placed in a box that will protect the product from damage due to shipment, water, sunlight, contaminants and to prevent premature release of herbicide. The protective wrapping shall be maintained during periods of shipment and storage.

6.3 During storage, preemergence weed control product shall be elevated off the ground and out of direct sunlight. It shall remain sealed in EVOH protective bag inside shipping box at a temperature of not more than 110°F.

7. PRODUCT DESCRIPTION

Overall Product Major Composition and Ingredients		Typical
Active Chemical*: 17.5%	Trifluralin (a,a,a-Trifluoro 2,6 - dinitro - N,N, - Dipropyl - p - toluidine)	
Inert Ingredients: 82.5%	100% Spunbonded Polypropylene, Polyethylene and Carbon	

<u>Trifluralin Characteristics</u> <u>Method*</u>	<u>Typical Values</u>		<u>Test</u>
	<u>English</u>	<u>Metric</u>	
Vapor pressure (mm Hg @ 25 ° C)	1x10-4	1x10-4	EPA CG 1600
Solubility in Water (ppm @ 25 ° C)	<0.3	<0.3	EPA CG 1500

<u>Fabric Properties</u>	<u>Minimum Values</u>		<u>Test Method*</u>
	<u>English</u>	<u>Metric</u>	
Unit Weight	3.9 oz/yd ²	130 g/m ²	ASTM D-5261
Grab Tensile Strength	130 lbs.	575 N	ASTM D-4632
Elongation at Break	60%	60%	ASTM D-4632
Puncture Strength	40lbs.	175 N	ASTM D-4833
Trap Tear	60lbs.	265 N	ASTM D-4533
Permittivity	0.7 sec.	0.7 sec.	ASTM D-4491
AOS (Max Value)	0.21 mm	0.21 mm	ASTM D-4751
Ultraviolet Stability	70% @ 500 hrs	70% @ 500 hrs	ASTM D-4355

*Test methods or revision numbers available on request (17.5% Average trifluralin in total composite, Min. of 20% trifluralin in nodules)

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