



**MORE
CHOICES**

**MORE
FLEXIBILITY**

**MORE
CONTROL**



**PRODUCT
SPECIFICATIONS**



BUNKER PREPARATION

Prior to installation of bunker liner, the Contractor shall insure that all bunker drains work properly. Drains which do not work shall be opened up, flushed out, or replaced prior to the placement of bunker liner and sand within the bunker.

The bunker subgrade area shall be lined with Sandtrapper bunker liner as manufactured by Indian Valley Industries, Inc., or pre-approved equal. The bunker liner shall be a highloft nonwoven geotextile consisting of durable polyester fibers, resin bonded, with non water soluble polymer to form an evenly distributed, U.V. stable, three dimensional blanket matrix specifically intended for bunker stabilization and drainage conforming to the following specifications.

SPEC TABLE

PRODUCT CHARACTERISTIC	ST-II	ST-MD	ST-I	ST-SL
Color	Opaque	White	White	White
Weight (oz. sq. yd./kg. sq. m.)	16 / .376	12 / .284	6 / .142	6.5 / .154
Thickness (mm)	15	14	11	25
Fiber Type	Polyester	Polyester	Polyester	Polyester
Binder	Cross-Linking Non Soluble	Cross-Linking Non Soluble	Cross-Linking Non Soluble	Cross-Linking Non Soluble
Area Per Roll - 56" (1.42m)	560 ft ² (51.93m ²)	1120 ft ² (104.5m ²)	1120 ft ² (104.5m ²)	240 ft ² (73.15m ²)
Area Per Roll - 90" (2.286m)	1125 ft ² (106.8m ²)	1350 ft ² (125.42m ²)	1800 ft ² (167.22m ²)	900 ft ² (83.61m ²)
Rolls/Container - 56" (1.42m)	60	55	55	call
Rolls/Container - 90" (2.286m)	38-42	38-42	38-42	call

The bunker liner rolls shall be 90" or 56" wide and will have a permeability of no less than 6.0 cm/sec under a 50 psf load. Product specification sheets must be submitted to the Golf Course Architect for review.

DURING CONSTRUCTION

If the bunker liner will not be installed for more than (30) thirty days after the installation of the gravel trench perforated drain pipe, or if the weather conditions are such that the pipe could clog, the Contractor shall also cover all drain lines with plastic to prevent clogging prior to the placement of the bunker liner.

INSTALLATION

The Contactor shall secure the bunker liner to the subgrade using 6" long, 11 gauge steel staples as supplied by Indian Valley Industries, Inc., or equal. Staples shall be placed in accordance with the manufacturer's recommendations and as shown in the Bunker Liner Cross Section drawing. Regular 'sod staples' shall not be accepted. Longer staples may be required if subgrade soil conditions are sandy. Adjacent bunker liner panels shall be overlapped a minimum of 2".

The bunker liner shall be terminated around the perimeter of all bunkers by securing the liner a minimum of 10" laterally back into the surrounding soil at such an elevation that the finished bunker sand level adequately covers the bunker liner, and as shown in the Bunker Liner Edge Detail drawing.



Previously placed topsoil surrounding the bunkers may need to be temporarily removed such that an adequate shelf is built to accommodate lateral anchorage of the bunker. Care shall be taken to avoid spillage of topsoil on to the bunker liner. The bunker liner will be placed such that all gravel lines are covered. Avoid placing liner seams above gravel drain lines.

AFTER INSTALLATION

The bunker liner shall be covered with bunker sand within thirty (30) days following installation of the bunker liner (ideally within twenty four (24) hours. If the bunker liner is not to be covered by sand within thirty (30) days following installation, the Contractor shall cover the bunker liner with an opaque plastic liner until sand is available.

PRODUCT WARRANTY

The bunker liner manufacturer shall provide a Ten (10) Year limited and prorated warranty to the Owner following installation per these specifications and upon receipt of full payment from the Contractor

OPTIONAL ON-SITE CONSULTATION

If requested by the Golf Course Architect, the bunker liner manufacturer shall provide a technical representative for consultation for one (1) full day on site at the start up of bunker liner installation and at no charge to the Contractor, Owner or Golf Course Architect. Golf Course Architect shall provide a minimum two (2) weeks notice to the liner manufacturer's representative for this service, if desired.

1-888-970-5111

www.sandtrapper.com



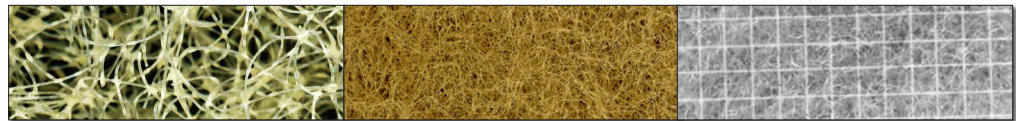
PRODUCT COMPARISONS



In most cases, articulating a product's features and benefits comes down to descriptive statements. Whether or not those statements are based in fact is, in many cases, irrelevant to a sales person trying to make a sale.

When introducing Sandtrapper, IVI-GOLF defined a very simple set of principles – create a durable product that has a framework for stabilizing sand geometries under water flow conditions. Simple yet effective. Over time, Sandtrapper's competition has made incorrect claims concerning performance and presented endless charts listing meaningless tests and test results.

To clarify important product characteristics and apply meaning to technical terminology, we've created the following tables:



SANDTRAPPER II

THE OTHER GUYS "BEST"

COMPETITOR'S TWO LAYER

	SANDTRAPPER II		THE OTHER GUYS "BEST"		COMPETITOR'S TWO LAYER	
Fiber Thickness	200 denier - Polyester		25/45 denier - Polyester		30 denier - Polypropylene	
Weight	16 oz/yd ²	542 g/m ²	12 oz/yd ²	406 g/m ²	22 oz/yd ²	750 g/m ²
Thickness	.78 in	19 mm	1.0 inches	25 mm	.39 inches	10 mm
Tensile Strength¹	59.4 lbs	26.9 kg	30 lbs.	13.6 kg	1234 lbs	560 kg/m
Compression	43.5 lbs	19.73 kg	25 lbs.	11.33 kg	n/a	n/a
Permittivity²	7.22 sec ⁻¹		3.5 sec ⁻¹		n/a	
Flow Rate	567 gpm/ft ²	384 lsm/m ²	250 gpm/ sq. ft.	169 lsm/m ²	n/a	n/a
Transmissivity³	3.92 x 10 ⁻³		n/a		0.4 l/s/m	
UV Resistance⁴	>80% @ 1200 hours		>75% @ 500 hours		>95% @ 500 hours	

TABLE NOTES

Note 1	This property is measured by a grab test method. It determines the effective strength of the fabric when subjected to forces that tend to pull the fabric apart. (ASTM-D4632) This is the standard method for determining geotextile design and quality control. A different tensile strength test is called Wide Width Tensile and is used primarily in woven geotextiles. (ASTM-D4595)
Note 2	Permeability or hydraulic conductivity of a geotextile divided by the geotextile thickness. The volumetric flow rate of water per unit cross sectional area per unit head under laminar flow conditions, normal [perpendicular] to the plane of the fabric. (ASTM-D4491)
Note 3	The volumetric flow rate of water per unit width of a geotextile specimen per unit gradient in a direction parallel to the plane of the specimen. (ASTM-D4716) This was performed using (Gradient = 1) and Normal Load (100 psf). The BunkerMat test result called "In Plane Flow" should be reflected as [N x 10-3] and is not.
Note 4	A measure of the potential for the deterioration of tensile strength in the fabric due to exposure to ultraviolet light and water. (ASTM-D4355).
SUMMARY COMMENT - The results of standard geotextile tests for products used in bunker settings should be used with caution. Beyond basic measurements, a product's characteristics or ability to secure bunker sand geometries is unable to be tested with these standard geotextile methods. Nothing is more irrelevant than the standard Apparent Opening Size test (called "Bunker Sand Passing Through" by BunkerMat), which essentially tests filter qualities and not sand geometries and stability.	

1-888-970-5111

www.sandtrapper.com



IMPORTANT TERMINOLOGY



Fiber Thickness	The thickness of fibers used in a bunker liner material is directly related to its performance. The greater the thickness (denier) of a fiber, the greater its durability, the greater its resistance to tearing, the greater its resistance to compression.
Weight	A product's weight is directly related to the amount of product. In this case, weight is more importantly linked to the amount of binder used in the securing synthetic fibers.
Tensile Strength	The tensile strength of a material is measured in terms of the amount of force needed to tear apart the material. In this case the greater the tensile strength, the greater its durability.
Compression	Measured in terms of the amount of weight necessary to deflect a material to 50%. In this case, compression is linked to a product's ability to maintain its three dimensional matrix. The greater the compression strength, the greater its ability to maintain integrity and consistent water flow over time.
Permittivity	Measured in terms of water flow across the fabric (perpendicular). In this case, permittivity is directly linked a product's ability to move water. The greater the permeability, the better the drainage performance.
Flow Rate	Measured in terms of volume, flow rate is linked to the product's ability to move a quantity of water. In this case, the greater the flow rate, the better the drainage performance.

FACT VS. FICTION

Ever since the golf industry began experimenting with various products, a cycle of hopes and doubts was created. A new idea, followed by trial and error always seemed to end in failure. First it was geotextiles. This stopped contamination initially, but fines came to clog the material, resulting in failed drainage. Next came natural mesh/non-woven materials. These worked to combat washouts and contamination, but the product decomposed and created failures.

Sandtrapper was launched in 1999, a synthetic matrix, designed specifically for bunker settings. With two product styles, each matrix targeted specific performance characteristics for shallow and high-flashed designs. Competitive products have been re-applications of existing technology, originally produced for water filters, concrete forming, and other irrelevant purposes.

	FACT	FICTION
Synthetic Matrix	The wide, open synthetic matrix of Sandtrapper allows for increased water flow through and below the sand layer, improving drainage performance, inhibiting washouts.	The tight matrix of competitive products yields the same performance characteristics as Sandtrapper.
Compression	The heavy denier (fiber thickness) and aggressive binders create a matrix that significantly resists compression, producing greater performance, especially over the long haul. A compressed matrix inhibits the flow of water.	The greater thickness of competitive liner fabrics without compression resistance provides greater water moving performance, even over the long haul.
Durability	The aggressive matrix produces a tensile strength of roughly 60 lbs. per sq. in., 200% of competitive products, with zero reported product failures. Products with a scrim layer significantly improves tensile test results but does not prevent snagging or tearing of the non-woven layer.	Sandtrapper falls apart

FACT VS. FICTION



UV Stability	UV stability is important when product may be sitting under daylight during pre-installation storage. However, once placed in a bunker and covered with sand, UV stability becomes far less a critical issue. UV stability is typically important in erosion control settings where the geotextile is above the soil and exposed to daylight over many months or years.	UV stability is important in bunker liners.
Scrim Layers	The addition of a scrim layer improves tensile strength of a material. While this would seem important, a scrim layer causes a negative effect. When a scrim layer is added, surface adhesion is greatly reduced. Without a scrim layer, the fibers “dig” into the bunker surface and provide this adhesion. With large denier fibers (Sandtrapper II), this adhesion is further increased, creating a solid foundation for foot traffic. This is evidenced by a now defunct product, BunkerNet/BunkerAid, which had considerable product performance issues related to the scrim layer with its natural and synthetic product styles.	Scrim backing improves short and long term performance.
Apparent Opening Size or “Sand Passing Through”	The size of openings is irrelevant to bunker liners. More important is the three dimensional matrix that a liner provides. The matrix provides points where bunker sands (which are highly angular) can lock together. As water moves through sand, the matrix prevents sands from becoming lively (creating washouts/slumps). Apparent Opening Size testing (or as BunkerMat refers to as “Sand Passing Through”) is relevant when testing geotextiles for dewatering or filtering applications.	Large openings allow sand to “pass through” and force the bunker liner to the surface.
Testing Results & Standards	Understanding basic product characteristics is important, but standard geotextile test results should be used with caution. Some tests do not correlate to valid concerns or performance in bunker settings. Additionally, terminology is often misused which leads to the misrepresentation of test results.	Standard geotextile test results for bunker liners are indicative of true product performance.
Reliability	Sandtrapper has been “in the ground” for over ten years, installed in over 1,600 golf courses worldwide without product failure. Some competitors have existed for just a few short years.	Competitive products last as long as Sandtrapper
Water Flow	Based on standard geotextile and erosion control tests, Sandtrapper has twice the permittivity and water flow over comparative, competitive products.	Competitive products have better drainage characteristics than Sandtrapper
Cost	The cost of a product is directly related to price and performance. The significantly greater performance and close pricing produces a far better value than competitive products	Sandtrapper is expensive.
Warranty	Sandtrapper has a 10-year product warranty, with a “Zero Replacement Cost” assurance for 4 years.	Sandtrapper doesn’t support their product with a warranty.
Delivery	IVI-GOLF stocks Sandtrapper nationwide and key points worldwide and in the quantities necessary for fast delivery. Many orders, if needed, are shipped on a same day basis.	Customer Service doesn’t matter.
Dimensions	Sandtrapper is available in 56” and 90” widths.	Sandtrapper has narrow rolls, which are more difficult and costly to install.
Installation	The cost to replace burned turf and root systems caused by torches doesn’t simplify installation	Competitive products suggest cutting with torches, which simplifies installation

PRODUCT INSTALLATION



Proper installation insures the maximum performance from your Sandtrapper Bunker Liner. Each of the product styles can be used to line the bunker or be used in combination for a specific bunker area.



Sandtrapper II is used for steep sloped bunker conditions where maximum performance is desired.

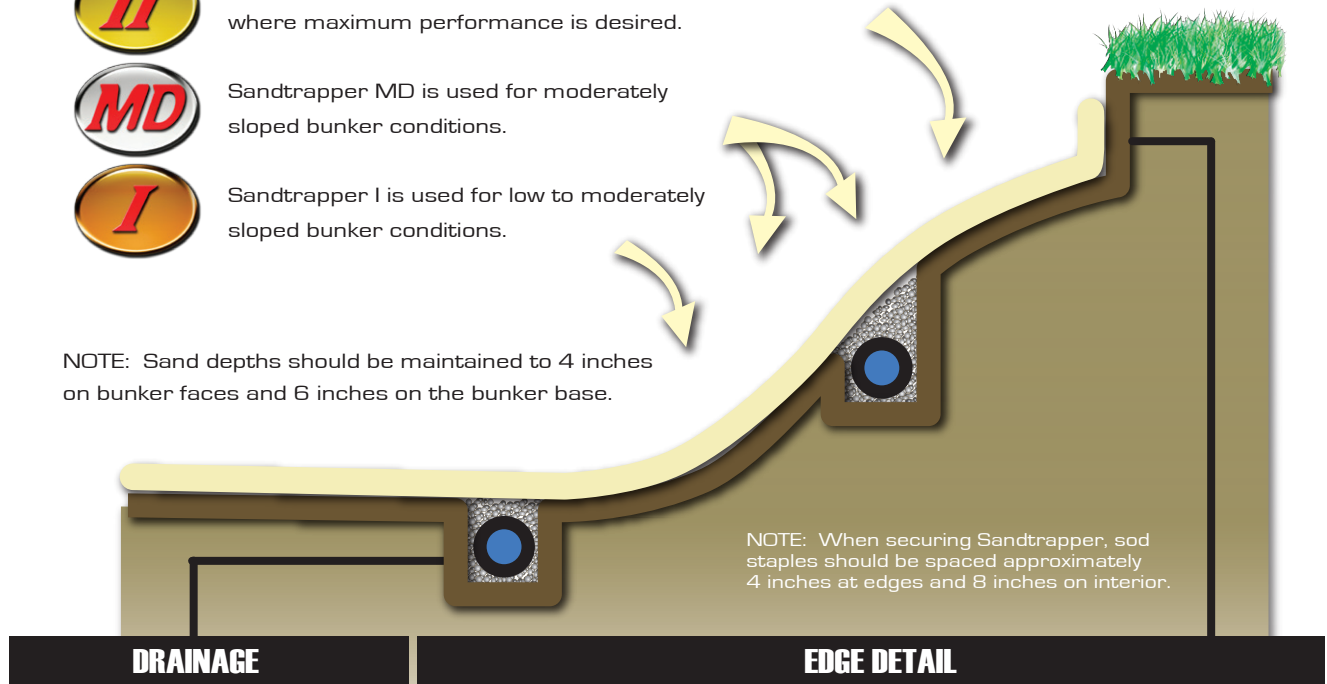


Sandtrapper MD is used for moderately sloped bunker conditions.

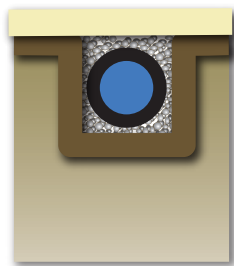


Sandtrapper I is used for low to moderately sloped bunker conditions.

NOTE: Sand depths should be maintained to 4 inches on bunker faces and 6 inches on the bunker base.



DRAINAGE

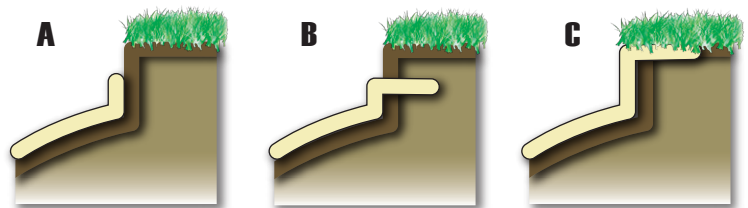


Sandtrapper II, MD and I are all able to be placed over drainage lines.

By doing so, maximum performance against drainage gravel contamination is achieved.

Should access be required to the drainage system, Sandtrapper can be tucked down and into the drainage trench.

EDGE DETAIL



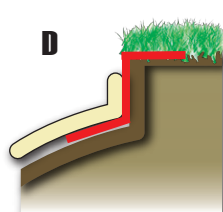
A variety of methods exist to install Sandtrapper at the bunker edges. Each has it's own advantage, given soil types and grass varieties.

OPTION A - Sandtrapper is brought to and up the bunker edge, being secured into the edge with sod staples.

OPTION B - Sandtrapper is brought to and up the bunker edge, then tucked into the soil below the root zone of the grass above.

OPTION C - Sandtrapper is brought up and over the bunker edge. Grass is placed on top with root structure growing into the liner.

OPTION D - Shown in red, Super Mighty Edge is an innovative way to secure the bunker edge. Super Mighty Edge is applied under the liner and secured into the edge with sod staples for long-term bunker protection.



888-970-5111
www.sandtrapper.com

CUSTOMER SERVICE

Acquiring products is also about service. With an incredible support system behind each Sandtrapper product order, professionals can plan confidently, knowing that they can get what they need, when they need it.

LARGE ON-HAND INVENTORY

IVI-GOLF supports the Sandtrapper product line by having it “on-the-floor”. With considerable quantities available, the timeframe from order to delivery is the fastest in the industry. Even for large orders, the inventory is ready to go.

NATIONWIDE & WORLDWIDE DISTRIBUTION

With a network of delivery hubs and warehouses nationwide, logistics are simplified. In specific geographic regions, Sandtrapper is distributed through exclusive relationships. In many cases, these relationships are with local businesses you know and trust. For the global market, Sandtrapper has the expertise to facilitate all shipments through many ports. Our global network of distribution can also make small orders affordable and efficient.

RELIABLE SUPPORT

Keeping track of the details is what IVI-GOLF is about. Delivery times, quantities, ancillary products – these factors can foul up a project if not managed correctly. As professionals have grown to expect things right, we don’t dissappoint.

COMPLETE PRODUCT LINE-UP

IVI-GOLF has more than just Sandtrapper and many rely on us to provide other important materials. For bunker and golf course products, IVI-GOLF manufactures Super Mighty Edge®, SIFON Drain Belt, and V-Staple® fasteners.

For tees and greens protection, IVI-GOLF manufactures Turf Shield®, custom-sized and fabricated turf covers.

For golf course construction, IVI-GOLF carries a complete line of erosion control products — including silt fence, excelsior blankets, straw mats, jute, burlap, and Futerra. These products can be found online at — www.sandtrapper.com.

1-888-970-5111

www.sandtrapper.com

