



INSTALLATION GUIDELINES

SPECIFICATIONS



GENERAL CONDITIONS FOR INSTALLATION

Flexxcape can be installed in a wide range of conditions. However, depending on upper and lower temperature ranges, specific guidelines **MUST BE FOLLOWED** in order to insure a correct, successful, and trouble-free installation.

Please read thoroughly **ALL INSTRUCTIONS AND GUIDELINES** before planning and executing your project.

PRODUCT STORAGE

Flexxcape is a specially formulated PVC material which has many great properties for use in a golf course bunker setting. The material maintains its strength and flexibility so that it can be a permanent bunker management solution.

After delivery of Flexxcape to the facility, the material can be stored outside for extended periods of time. Depending on the time of year and your scheduled installation, several handling and storage requirements will need to be followed for a trouble free installation. Make sure to carefully review the Product Storage Section of this document.

FLEXXCAPE BONDING AGENT

Flexxcape Bonding Agent is a specially formulated cement to work specifically with Flexxcape. Standard cements or adhesives will not correctly fuse Flexxcape segments for a permanent bond.



The Bonding Agent is manufactured with highly flammable solvents and can be dangerous with contact to skin and extremely dangerous if ingested or fumes inhaled. Please follow all recommendations in the Material Safety Data Sheet (MSDS) for proper handling and use.

SUCCESSFUL INSTALLATION

We have had successful installations occur in a wide range of temperatures. In addition, we have installed Flexxcape during rain events. Following these guidelines will insure your project is successful.

Should you have any questions regarding, contact:

Customer Support at 888-970-5111 or info@ivi-golf.com



GENERAL CONDITIONS FOR INSTALLATION

Flexscape can be installed in a wide range of conditions. When seasons change and temperatures become colder, certain precautions are necessary to avoid installation delays or inconveniences.

Flexscape is shipped in palletized form. During our manufacturing and packaging processes, the shape of the Flexscape roll will flatten slightly. When exposed to colder temperatures in the palletized state, the Flexscape material will have “memory”. When unrolled from this state in cold weather, the material will be flexible but maintain some waves and not lay as flat to the bunker base as desired. By storing in a heated, inside area prior to use, the material will become much softer and the “memory” will be eliminated.

PRODUCT STORAGE

Follow the table below to determine what basic storage and pre-installation storage measures should be followed. Should any doubt exist, always default to a “warmer is better” plan to avoid installation challenges. NOTE: Pre-installation storage is described as the amount of material needed for the next day’s installation effort. We typically state that a 3-man team can install 1,100 square feet of product (approximately 7 rolls) in under 2 hours.



Nighttime Low Temps	Basic Storage	Pre-Install Storage
>75° F (23.8° C)	Outside Storage	Outside Storage
>60° F (15.5° C)	Outside Storage	Inside Storage
>45° F (7° C)	Outside Storage	Heated Inside Storage
>30° F (-1.1° C)	Outside Storage	Heated Inside Storage (20+ hours)
>30° F (-1.1° C)	Inside Storage	Heated Inside Storage (8+ hours)

Depending on the personnel and amount of product intended for installation on the following day, storage can remain on pallets. In colder temperatures, it is advisable to remove from pallet and stand rolls vertically on end for pre-installation storage. We package 15 rolls of Flexscape per pallet, so it is conceivable to have 2 or 3 pallets in pre-installation storage.

Following these guidelines will insure that the material’s shape memory will not cause waves in the material when rolled out in the bunker. Proper storage will allow material to lay flat when unrolled and improve the bonding process of material segments. High temperature ranges experienced during warmer months have no negative impact on installation.

GENERAL DESCRIPTION - FLEXXCAPE BONDING AGENT



The Flexscape Bonding Agent is a specialized adhesive designed just for the Flexscape material. It is manufactured in a viscosity similar to honey. Colder temperatures when storing or installing, will slightly thicken the Bonding Agent.

It is not a fast acting epoxy or contact cement. The bonding agent chemically fuses the Flexscape material for a permanent bond. It has a low initial tack or stickiness, so one should not expect the bonding agent to immediately hold segments together.

Unless segments are in relative close conformity and can be temporarily held by stapling or use of hog rings (discussed later in this document), the bonding agent will not keep them together. Required cure time for final cure is minimum 24 hours. Warm temperatures can improve cure time, but it is preferred to use the standard 24 hour cure threshold.

Cooler/colder temperatures will increase the cure time. Should gaps in the bonding agent exist on the material, additional bonding agent can be applied.



PREPARATION

The bunker to be lined should have the base and slopes of the surface firm and compact. All drainage should be checked, repaired, or installed prior to Flexscape installation.

PRODUCT HANDLING

Each roll of Flexscape weighs approximately 121 lbs. and can be moved around the facility in a utility vehicle and placed into bunker with two people. Each Flexscape roll has a hard cardboard core to which it is rolled.

PLACEMENT

Flexscape can be rolled out into strips covering the bottom of the bunker. This can be done by simply pushing the roll across the bunker to unroll (two persons). Optionally, one can insert a pipe into the roll core, hold the roll stationary and pull and extend to unroll (three persons).

When initially placing Flexscape, a small amount of material should go beyond the actual edge. This will help when positioning material for final fit prior to bonding.

Each segment can be easily cut from the roll using a standard utility knife with ease. Should blade dull, replace frequently to speed the trimming process. Be careful to closely pre-fit segments prior to cutting from roll to minimize waste.

BUTTING or OVERLAPPED EDGES

Once segments are pre-positioned, the edges of each section are butted together. In order to temporarily hold segments and edges together, a standard 3/8" staple can be driven across the seam.

Alternatively, one can use standard sod staples to keep segments pinched together for bonding. After bonding agent is set, sod staples can then be removed and reused.

Some have preferred a 2-3" overlap of segments to increase surface area being bonded. This essentially avoids having to temporarily use staples to hold, but will increase the amount of Bonding Agent used during installation.

PREPARATION FOR BONDING



The Flexscape Bonding Agent is manufactured in a viscosity similar to honey and is supplied in a one gallon tin container.

In order to simplify application of the Bonding Agent, we recommend transferring to a narrow-tipped squeeze bottle. These can typically be located at local home supply/hardware stores or large box stores. A 32oz. size bottle works best, to reduce the frequency of tin/bottle transfer.

Some have found success using something as simple as a used condiment or liquid soap squirt-bottle (must be thoroughly cleaned). These are many times present in employee break rooms.

Attempts to apply the bonding agent directly from the 1 Gallon container is not advisable. This will result in the inconsistent application of bonding agent, result in excessively more bonding agent being used, and create additional mess with the bonding agent on the container, hands, and other objects.



BONDING SEGMENTS

The Flexscape Bonding Agent is a specialized adhesive designed just for Flexscape. It will not instantly affix pieces, but will slowly melt the PVC strands and chemically fuse when curing. It is not a fast acting epoxy or contact cement.

Cure time will be longer in colder weather and more rapid in hotter weather. Rain or moisture will have little impact on the application process or curing time. Avoid getting the Flexscape material covered in dirt or mud.

Apply a heavy, steady stream of Bonding Agent over the butted or overlapped edges. It will slowly drip down and seep into the entire profile, around all of the strands. Should some areas not get full coverage of Bonding Agent, additional material can be applied.

The Bonding Agent will be slightly soft as it begins to cure, but will be holding pieces lightly together. If aggressively pulled at, the Bonding Agent will separate.

For final cure, 24 hours is required. Warmer or hot temperatures will decrease cure time. A small area can be tested to determine if a proper bond is achieved. Should more Bonding Agent be needed, re-apply as necessary.

All bonded edges should be checked for a complete connection of material before any sand is placed into the bunker.

24 hours minimum is required for proper cure of bonded surfaces

TRIMMING EDGES

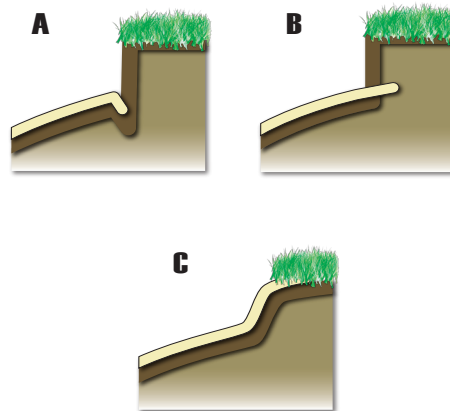
Once the edges are bonded, the excess material at the bunker edge can be trimmed. Trimming can be performed easily with a standard utility knife. The sharper the blades, the smoother the finished cut will be. Terminating Flexscape can be accomplished by tucking into a V-notch (diagram A), tucking into the side cut (diagram B), or by running up and over the cut (diagram C). Finish sod can be placed directly on top of Flexscape for grow-in. If using cooler season grasses, option A or B is preferred.

SECURING FLEXSCAPE

The weight of Flexscape will keep it in place. The flexible nature of the product will allow it to conform to any irregularities in the bunker base, including drainage lines/gravel. There is no need to staple the product. Should one wish to secure Flexscape on the perimeter, this can be done with standard sod staples.

MAINTENANCE

Flexscape requires no maintenance. The PVC formulation is incredibly durable while maintaining conformity even in a frozen state. Flexscape will not crack or break-up under repetitive freeze/thaw cycles.





PRODUCT DEVELOPMENT

As the manufacturer and marketer of the popular Sandtrapper product line, we took our expertise in geophysical controls and applied them to the seamless bunker liner concept. We focused on maintaining simple handling and installation requirements. We focused on washout control and consistent playability. We focused on maintenance durability.

Flexscape is a non-degradable, synthetic material manufactured with precision specifications and capable of standing up to the most rigorous environmental conditions. It withstands freeze/thaw cycles, mechanical raking, and ultraviolet exposure.

PERMANENT & FLEXIBLE MATERIAL

Flexscape is manufactured from an industrial PVC in a patented extrusion process that chemically bonds strands together. During the process, small loops are created which increase surface area and adhesion. The proprietary PVC formulation is incredibly durable while maintaining conformity even in a frozen state. Flexscape will not crack or break-up under repetitive freeze/thaw cycles.

Flexscape is manufactured with precision specifications and packaged for convenience. The patented manufacturing process results in a material that can be counted on day in and day out.

PHYSICAL PROPERTIES

Material	Flexible PVC	
Color	Natural	
Thickness	3/8 inch	9.5 mm
Roll Width	42 inches	1.067 m
Roll Length	45 feet	13.72 m
Roll Area	157.5 ft ²	14.63 m ²
Weight	.768 lbs ft ²	3.75 kg/m ²
Roll Weight	121 lbs	54.88 kg
Rolls per Pallet	15	
Area per Pallet	2,362.5 ft ²	219.48 m ²
Pallet Weight	1,832.5 lbs	831.2 kg
Pallets per Truckload	24	
Area per Truckload	56,700 ft ²	5267.6 m ²

MECHANICAL PROPERTIES

Grab Tensile Strength (ASTM D-4632)	120.5 x 90.6 lbs	54.66 x 41.1 kg
Grab Elongation (ASTM D-4632)	99.7 x 89.3 %	
Trapezoidal Tear (ASTM D-4533)	64.6 x 53.5 lbs	29.3 x 24.5 kg
CBR Puncture (ASTM D-6241)	165.3 lbs	75 kg
Flow Rate (ASTM D-4491)	549.8 gpm/ft ²	
Permittivity (ASTM D-4491)	7.35 sec-1	
Permeability (ASTM D-4491)	6.059 cm/sec	
Transmissivity (ASTM D-4716)	1.92E-03 m ² /sec	