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PUTTING GREEN CONSTRUCTION MANUAL

BUILDING THE BASE

When constructing a putting green the first thing to take into consideration is the lay of the land. As a rule the slope should not exceed three inches over twelve feet or about 2%. The slope of the land must be factored in when calculating the amount of base material needed to create a base with the appropriate slope. It is also important to consider the soil composition. In most parts of the country it will not be necessary to use a base stabilizing material. However, in areas of the country where sandy soil is prevalent or in low lying areas that are subject to excessive moisture it may be necessary to use geotextile fabric under the base.

The most common base material is unwashed limestone. This material is often referred to as Crusher Run or ABC. Unwashed limestone is nothing more than limestone with fines which makes it possible to "choke" or thoroughly compact the mixture of stones and fines. Normally the initial layer of base material should be approximately four inches thick after compaction. However, the underlying soil may permit the use of less or require the application of more base material. A ton of material will cover 80 square feet 2 inches thick. That same formula applies to the screenings, fines or stone dust that make up the second or top layer of the base.

When constructing the base it is a good idea not to exceed two inches before compacting the base with a vibra-plate tamper. If the base is being compacted with a water filled roller compaction should be done every one inch of base material depth. Regardless of how the base material is compacted it is important to achieve approximately 95% compaction to avoid settling.

When constructing your base keep in mind the desired slope and undulations and begin to build the base to reflect the finished green surface. This will make it easier to achieve the desired surface characteristics without having to go too thick or too thin with the top layer



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of screenings. It is a good idea not to exceed one inch of depth with the screenings with one half inch being the desired depth.

After applying the screenings the base should be rolled with a water filled roller, or in the case of a large green, 1000 square feet or more a one ton ride on roller works best to compact the screenings. A vibra-plate tamper may also be used if desired. However, frequently the screenings are too wet or too dry to obtain satisfactory results with a vibra-plate tamp. If the screenings are too dry they will not compact. If this should occur it is advisable to use a garden hose and spray water on the base to dampen the material. If the screenings are too wet the base of the vibra-plate tamper will "cake up" with material and create such ridges in the surface that make it difficult to work the base to get out all the imperfections. If the base is too wet the vibra-plate can also pull water to the surface which sometimes results in the base "pumping" or feeling spongy. After the screenings are compacted the surface should be worked with a Level Lawn to create a smother surface. A four foot drag mat should also be drug over the base to reduce the amount of imperfections in the base. When the base has the desired slope and undulations it is time to determine where to locate the cups.

LOCATING AND SETTING CUPS

Proper location of the cups is critical to the appearance and performance of the putting green. As a rule the cups should be located at least three feet from the edge of the green. This is done to both enhance the green's appearance and to allow a missed putt to roll to a stop before rolling off of the green. Greens tend to look better with an odd number of cups. Slope and undulations are important considerations when determining the locations of the cups. Try to avoid locating cups on a slope or on a seam. Typically cups should be located so that a properly struck putt will have a chance of going in from anywhere on the green. It is also important to consider the location of each cup in relation to one another as to avoid cups being in the way of one another. A good way to visualize this is to place the sleeves on the green surface where the cups will go. The sleeves can be moved until a suitable location for each cup is determined. A well constructed putting green practice facility will provide for a flat or straight putt, a long putt and left to right and right to left putts. Rolling



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a tennis ball or softball over the surface makes it easier to visualize the line the putt will take. It is also very important to involve the client when locating the cups to ensure that they are satisfied with the green before the turf is installed.

Once the cup locations have been determined leave the sleeve on the surface so the location won't be lost. A post hole digger or 6"auger may be used to create an appropriate sized hole. Typically the hole should be at least twice the depth of the cup to permit debris to fall through and to allow for the possibility of standing water. Placing Pea Gravel in the hole makes it easy to position the cup and it prevents the cup from being pushed down when the pins are being replaced as the green is used. The sleeve should be located flush with the finished surface of the putting green base. A good way to ensure that the sleeve is positioned properly is to use a straight edge positioned across the hole. Both sides of the sleeve should be touching the underside of the straight edge which should be resting on the base surface on either side of the hole. When the sleeve is properly positioned pack the material taken from the hole tightly around the sleeve. Compact the material with a shovel handle or similar device. Placing the cup in the sleeve during this process will prevent deformation of the sleeve. Remember to remove the cup before the turf is laid. The final one to two inches of material compacted around the sleeve should be the same composition as the top layer of the green. Building a ring of this material around and about an inch above the sleeve and compacting it with a hand tamp usually results in a well compacted and smooth surface. Once this is done go over the area within a three foot radius of the sleeve with a Level Lawn to ensure the area is smooth. Repeat this process until all the sleeves have been installed.

INSTALLING SYNTHETIC TURF

All turf will have a grain to it. When installing two or more pieces of turf; be sure that the grain is going in the same direction. (This rule will not always hold true when installing fringe material.)

After the turf has been laid out it should be broomed by hand or with a power broom to stand up the fibers and to begin to break up or fray the turf fibers before any sand is dropped into the turf. After brooming the turf lay the turf on the green in the desired



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position. Check to be certain that none of the cups are too close to the edge of the turf. Also check to be sure none of the cups will be on the seam. After positioning the first piece of turf at the desired location place sand bags about every ten feet around the perimeter to be sure it does not move. Locate the next piece of turf in the approximate position where it is to go. At this point flip up both inside edges of the two pieces of turf and remove the edge known as the salvage. Normally cutting between the second and third row of fibers will result in a good edge for seaming the two pieces together. When making this cut, stay up against the third row fibers. After cutting both edges of the two pieces of turf that are to be seamed align the two pieces of turf. The gap between the two pieces of turf should not be greater than the width between the rows of fibers. The ideal gap is about one sixteenth to one eighth of an inch. Maintaining the proper gap will usually result in the seam disappearing as the sand is broomed in. Never seam together two pieces of turf that are overlapping. Frequently it is not possible to properly align the turf to ensure the entire length of seam is the desired width. It may be necessary to overlap the material and trim one side or the other to get the proper width gap. This is not unusual due to the fact that the turf is not lying on a perfectly flat surface. After the second piece of turf is properly positioned place sand bags on it and proceed with any trimming necessary to obtain the desired gap. It is also possible to adjust the gap slightly by stretching the material. When using this technique remove the sand bag weighing down the turf in the area to be stretched and replace it as soon as the gap reaches the desired width. When using this technique it is important to maintain the weight on the turf until the glue has dried or the turf will tend to shrink or return to its original position. Prior to seaming the material it is important to ensure that there are no wrinkles in the portion of the turf that is to be glued. Small wrinkles in the turf will usually disappear as the sand is added. However, wrinkles that are seamed in will not go away so wrinkles on the seam must be avoided. Once all of the pieces of turf are properly positioned and the seam has been properly trimmed it is time to cut the green to shape. It is best to do this prior to seaming the pieces together to avoid pulling the glued pieces apart.

Cutting the green to shape is usually done using a slide knife commonly referred to as "loop pile cutter". It is a good idea to make a mark on the turf indicating where the cut is to be made prior to making the cut. This can be done by pushing the slide knife on top of the turf



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against the grain. This will make a visible line that can be adjusted until the desired shape is achieved. Once that is done the slide knife should be positioned to make the cut, going with the grain whenever possible. Keeping a sharp blade in the knife will make this process much easier and the resulting cut will be much smoother.

In preparation for seaming the turf make a short line in the base at either end of the seam as a center line reference point for positioning the seaming tape. After doing this flip back both edges of the turf the length of the seam. Typically folding them back about twenty-four inches is adequate to provide room to roll out the seaming tape and ensure that the turf does not flip back down. In windy conditions it may be necessary to secure the turf in the flipped back position by placing sand bags on the edge of the turf about every eight feet. Lay the seaming tape the length of the seam ensuring that it is centered and secured on either end. If it is at all windy it is a good idea to weight the seaming tape at several locations along the length of the seam to avoid it being picked up by the wind. Pour the glue in an "S" pattern along the length of the seam and trowel the glue the width and length of the seaming tape. Typically the trowel should have a serrated edge with the grooves being one-sixteenth to one-eighth inch depth to achieve good distribution of the glue. As soon as the glue has become slightly tacky the turf should be laid in. The warmer the ambient temperature the more quickly the glue will become tacky. For best results both sides of the turf should be laid in simultaneously. You will notice that fibers on one side of the turf tend to be lying flat while the fibers on the other piece of turf appear more upright. When laying the turf in the glue be careful not to trap the fibers lying flat under the other piece of turf. If the two pieces are placed down simultaneously or if the piece of turf with the more upright fibers is laid in first, trapping fibers should not be a problem. Work along the length of the seam in the same direction as the glue was poured to prevent the glue from drying out too quickly. Once the seam is laid in go back and check to ensure that it is in place and the turf has not gapped anywhere. As soon as the glue is sufficiently dry that it will not ooze up through the seam, the entire seam should be rolled with a carpet tractor. This should be repeated several times over the next hour to ensure that all of the turf is securely glued down. Frequently it is a good idea to place bags of infill over the length of the seam to ensure that the glue firmly contacts both pieces of turf.



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FILLING THE GREEN WITH INFILL AND TOP DRESSING SAND

Once the green is cut to shape and seamed it is time to begin dropping the infill. However, before you begin to drop infill it is a good idea to broom the turf either by hand or with a power broom again, going against the grain. Brooming the turf before dropping the infill will accomplish two things. First it stands up the fibers making it easier to get the infill to fall in. Secondly, it will break the fibers up which will result in the turf laying down more easily and coming up to speed more quickly once you begin rolling the green. Dropping the infill should be done with a drop spreader or a broadcast spreader. The important thing is to get the infill distributed evenly. To ensure even distribution begin by dropping a small amount usually about four to five hundred pounds before brooming the turf. Obviously the size of the green dictates the amount of infill that can be dropped before brooming. Once the infill is thoroughly broomed in, drop another round and broom it in. This process should be repeated until all of the infill has fallen into the turf and appears to be distributed evenly throughout the green. The green is full of infill when it is within one-eighth of an inch from the fiber tips. The amount of infill required varies depending on the length of the turf. For turf that is one inch in length about five pounds of infill per square foot will be needed to fill the green. For turf that is one and a quarter inches in length about six and one half pounds of infill per square foot will be needed. To determine how much infill you will need take the total square footage of the green and reduce it by 10% to allow for the area lost when the green was cut to shape. In most cases that method will be fairly accurate. If the green is fringed allow additional material for the fringe. Normally fringe will get less infill than the green. Typically fringe should get two to three pounds of infill per square foot.

Once the green is full of infill it is time to drop the top dressing sand. For best results drop one pound of top dressing per square foot. If you are using a drop spreader it is a good idea to reduce the setting on the spreader so the top dressing comes out more slowly. This will prevent rows that will require a lot of brooming. At this point in the process you want to avoid too much brooming as it will tend to bring the infill sand to the surface and mix it with the top dressing. The best way to spread the top dressing sand with a broom is to back drag it, or to use a push broom that is not as stiff as what was used with the infill sand. A leaf blower also works well to evenly distribute the top dressing. The objective is to



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get the top dressing evenly distributed without pulling up a lot of infill sand. Once the appropriate amount of top dressing has been dropped and spread evenly it is time to begin rolling the green.

ROLLING THE GREEN

Rolling a green with a water filled roller will compact the infill, and flatten the fibers resulting in a firm smooth surface. Direct sunlight and ambient temperature have a lot to do with how quickly the green will come up to speed. The hotter the turf, the more quickly it will gain speed. Normally it is difficult to get a green to roll faster than a "10" on a Stimpmeter the first time it is rolled. Frequently you will have to roll the green more than once to achieve the desired speed. For that reason it is a good idea to include an inexpensive water filled roller in any out of town jobs. For best results roll the green back and forth going with and against the grain.

FINISHING THE JOB

When finishing a green construction project the work site should be cleaned up of all debris. It is also a good idea to do some minor landscaping around the green perimeter to make it blend in with the surroundings. That could mean grooming the soil, laying sod or spreading pine straw, mulch etc. Anything that can be done to return the area around the green to its appearance prior to the construction project should be done. This results in the green having a nice finished look and is likely to result in a more satisfied client. Keep in mind that satisfied clients are one of your best sources of future leads.

Disclosure

This guide is for the individual or contractor who wish to self install their artificial turf project. Artificial Turf Supply makes no representations or warranties regarding the following installation information. This guide is a best effort to installing artificial turf putting greens and is not intended for some other specialized artificial turfs, not all results are guaranteed. Artificial Turf Supply in conjunction with Artificial Turf Products has gathered and organized the above information in order to provide you the most detailed and comprehensive installation guide in the industry.