

Infill and Top Dressing Materials

Not all types of turf are built to use infill materials. If you are using a turf that requires infill, always check with the manufacturer or distributor for how much and what type of infill materials they recommend for best results. This answer will change for different applications so be specific about what you are using the turf for when you discuss this.

Why Infill

Infill materials were first used with 2nd generation synthetic turf products in the late 1980s and are intended to be used to fill the gaps between rows of turf blades while adding ballast (weight) to the surface face.

The distributed weight holds the turf in place and helps to achieve a more natural feel underfoot for sports uses.

Types of Infill

Defined as an "artificial root system", the first infill material used was quarried silica sand. Then, crumbed rubber was added to the infill system and now, new products are becoming readily available. Acrylic or rubber coated silica granules and beads of polymers are now options.



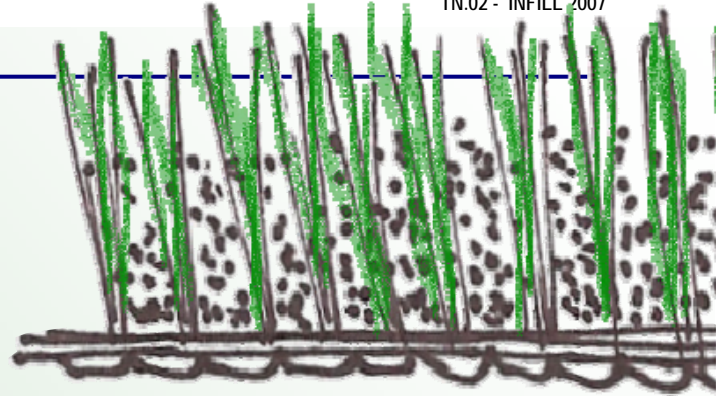
Silica

Silica is a naturally occurring crystal, made up of, what is essentially, the same materials found on the world's beaches. There are two types of silica granules used as infill today. Round silica grains are quarried in only 3 locations in North America, while sub-angular granules of silica can be mined almost anywhere in the world.

Like most granulated products, silica sand is quarried and screened into a variety of sizes or "mesh", during packaging processes. The raw products may also be washed prior to shipping in bulk, bagging in super bags or packaging in 100 or 50 lb sacks.

The size of the mesh screen used at the quarry will determine it's size rating. Most silica sand granules used for infill will range from a very small size of 30 mesh to a larger size of 10 to 20 mesh. The larger the number the smaller the granule. Anything above a 30 mesh is too small of a granule (powdery) to be appropriate for use as infill materials.

Sub-angular silica granules are shaped much like crushed, hard rock, such as granite. Though silica is rated as the second



Infill serves as a root system for turf blades

hardest substance to diamonds, sub-angular sand grains... contain microscopic fissures, cracks and sharp, pointed edges. The structure of the grain can easily crushed into smaller pieces and the pointed edges can get knocked off, creating finer particles.

Turf manufacturers, using sub-angular silica sand alone as an infill, found that after several years of heavy traffic, the infill compacted and made the turf surfaces harder. The breakdown of the sand granules' edges into dust also choked the system with fines and the drainage of turf began to be affected, negatively.

At the same time, recycled tire and shoe rubbers began to find there way to market. Shredded, cut into chunks and used to resurface park and track surfaces, the rubber products proved to be available in abundance, resilient and, if crumbed and mixed with the silica sand granules, would serve to enhance the infill system. The crumbed rubber would help keep the silica sand from compacting and also increase the responsiveness and natural feel of the turf surfaces for sports play.



Silica & Crumb Rubber Mixed

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TechNote High Lights

This Issue:

Infill and Top Dressing Materials
Types of materials
How to infill evenly
Inappropriate materials
Suggested amount to use

Infill and Top Dressing Materials (con't from pg1)

Crumbed Recycled
Tire Rubber



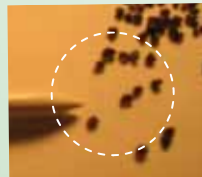
Other turf suppliers adopted the use of crumbed rubber alone as an infill. Used as a solitary infill material, crumbed rubber will provide cushion to make the surfaces feel extremely spongy underfoot and its bulk efficiently fills turf surfaces, delivering a natural feel.

Sand and granulated products suppliers continued to research solutions. Graphite and other

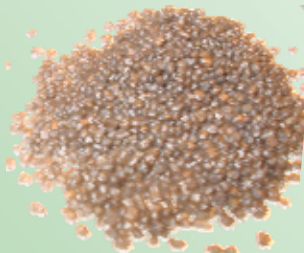
naturally colored and dyed materials were tested and many didn't meet abrasiveness standards.

A naturally occurring round silica sand was found. Available in only a handful of quarry locations around the world, grains form as round shapes which are less likely to chip or compact over time. This new material increased the use of silica as a single infill material again. It is very popular used as putting green top dressings.

As the market has matured, other infill material improvements have been introduced. US Greentech announced their patented infill material called Synthetic Turf Fill™ (STF) early in 2004. STF™ is a unique infill material in that it takes the rounded silica sand granules and applies an acrylic coating which is baked on, sealing the grains; making them impervious to germs and wear.



Round silica
grains



How Much Infill

How much infill and what type you use is determined by the application and type of turf you use. Lawn areas are built differently than sports fields which are built differently than putting greens. Also, the total blade count, stitch gauge and blade length needs to be considered when determining total infill required.

ASGi has compiled an infill chart (see chart - at right) that has been prepared from a variety of published specifications. It can be used as a general guideline for how much infill to use, however, always confirm the recommended amount from your turf supplier, based upon the turf's use, stitch gauge and blade length.

Inappropriate Infill Materials

There are several materials that are completely wrong to use as infill. They are inappropriate due to the risk of danger for the installer, consumer or to the effectiveness, durability or warranty of the turf system.

Coal, copper and nickel slag - by-product of smelting, or super-heating various materials. Slag is a crushed material and is used as an abrasive in surfacing metals. As described by name, the slag starts as either coal, copper or nickel.

The material is made up of sharp sub-angular shards of glass-like grains that can cut and cause splinters in any flesh or get into eyes or respiratory system. Fines can stick to clothing and fur potentially causing skin irritations.

Materials are sharp enough to cause damage to turf blades, especially in high traffic areas, causing blades to weaken and break off. Though many products available for public consumption pass minimum testing, slag materials are not considered to be environmentally sound.

Masonry and Play Sand - these products contain large quantities of dust and clay fines which can cause compaction of surfaces, reducing resiliency, increasing matting and possibly decreasing the effectiveness of percolation systems. These materials often contain a variety of sizes of various materials including silica sand grains, small pebbles and rocks, fines and other material. Small rocks and pebbles can often vary in size so that the largest could cause significant damage to professional equipment and will prove to be unruly in creating an evenly infilled surface.

Crushed Graphite and other processed or recycled glass materials - These materials, like slag, can be sharp and can contain large quantities of dusts that are dangerous to handle for the installer and consumer. The sharp edges of the grains can damage turf blades, especially in high traffic areas.

Average Infill Ratio by Fiber Height:

Average Infill Ratio by Fiber Height:		
Landscape Applications	2 inch	3 to 4 Lbs per SF*
	2.5 inch	4 to 5 Lbs per SF
Playfields - General Use	2 inch	4 to 6 Lbs per SF
	2.5 inch	5 to 7 Lbs per SF
Putting Greens	3/8 inch	2 Lbs per SF
	1.25 inch	3 to 4 Lbs per SF
Chipping	1.5 inch	2 to 3 Lbs per SF
	2 inch	4 to 6 Lbs per SF
TEE	2.5 inch	6 to 8 Lbs per SF

Infilling the Artificial Grass Surfaces



Anyone who has ever infilled artificial grass surfaces knows the downside of rushing the process. Results can be "day-killers" — uneven infill that makes the surface ugly, rumped,

bumpy just creates added steps, cost and time to the job. The key to infilling is patience and details.

Critical to your success in doing the job right the first time is **patience and concentration**.

Pick your "infiller" with thought - his may not be a task for everyone on your crew!

Take the time to bloom your turf before you start to infill. This perks up the blades and helps the first layer of infill to go down, deep, into the surfaces.

Start in an obvious point where you can walk the area in a consistent pattern. **DO NOT OVERLAP** your efforts - this will create heavily infilled lines throughout the finish. To help distribute infill evenly, apply it in stages.

Put down at least 10% of your infill and then take the time to rake this into the surfaces. It is a very important step as the sooner you get all the blades standing the less raking you will have to do to finish infilling the surfaces evenly.

Check into using [shag] carpet rakes instead of brooms. The tynes of the rakes dig deeply into fibers, yet are safe for use. **NEVER use metal brushes on turf blades**—the metal bristles will fray and over bloom the blades making them weak and prone to breaking. Using metal tools may also void your turf warranty!



Infill Evenly

The more evenly the infill materials are spread across the surface, the more even the color tone will be. Walk around the outer edges of the site to check for variances in color; lower spots will look lighter because the blade will be lying lower/flatter than properly filled surface areas. Dress lower areas by hand using a flat shovel and infill. Rake or power brush infill into surfaces, evenly.



Work Edges by Hand

Always work edges with hand tools to insure the best results. Work the infill in deep into the pile of the fibers and remove excess infill on any edges with a shop-vac for a clean look.



Finishing

Check the visual appearance of the surfaces—variations in color are often caused by too much or too little infill. Evenly infilled surfaces will look and feel very consistent.

Add materials and rake in where needed. Clean off extra infill with a blower and broom.



INFILLING—Key Points to Remember

- Keep your infill materials **DRY** and **CLEAN**
- Clean all the site's surfaces of dirt, base and cut blades before you begin infilling
- Clean and maintain your drop spreader weekly by clearing the infill residue with air pressure; use a dry spray graphite lubricant on all movable parts
- Brush (bloom) the turf surfaces with power brushes, brooms and/or rakes to perk-up new blades and then to help even out the infill later
- Infill **EVENLY** by using proper tools that help to flow the infill onto the surfaces evenly for you. Uneven infill just costs more labor and materials to correct later—it can kill a day!

close up on ...

Silica Sand Infill

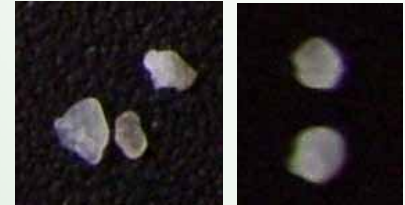


20 -to 40 Mesh

Next to diamonds, silica is the second hardest natural; crystal material known and used for a variety of uses in manufacturing and construction.

Available the world-over, silica sand materials are typically graded by shape, size, color, type of base crystal structure and it's amount of "foreign" materials mixed in with it.

Two varieties of silica dominate the artificial grass market. The most common form of silica sand available today is a sub-angular shaped grain that has sharper edges, points, ridges and angles that may crush off and create dust and silt in the surface fibers, with wear.



Sub-Angular Crystals
(left)

"Round" Crystals
(right)

Another less common shape, considered "round", is mined in only a handful of quarries, globally, making supply often tenuous and freight costs extravagant. There are three operating quarries in the US, at this time.

All infill materials using silica sand will require that those granulated products be "cleaned" and free of all other materials (organic materials, clays, dust, lime, etc) to perform at their peak.



Sub-Angular shaped crystal grains can have ridges and jagged edges, much like broken bits of glass.

These edges and tips are weak and can break off, creating dust that compacts the surface system.

Harder edges remain sharp and can be abrasive to artificial grass yarn fibers.

Silica comes in a variety of shapes, colors and sizes and this is often dependent upon the location of the quarry in which the material is mined.

close up on ...

Crumb Rubber Infill



8 to 25 Mesh
 SBR Rubber - Crumb



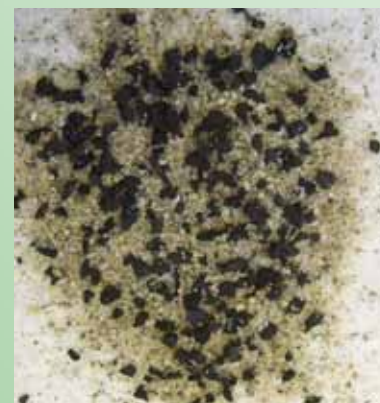
Artificial grass and infill systems were developed in tandem and infill material selection is based upon several factors. A key element in yarn life and the surface's ability to spring-back from heavy traffic promoted the use of rubber crumb.

Fiber height and space between artificial grass blade yarns, tufted into the backing of the finished materials play a key role in a surface's resiliency (GMAX). The wider and deeper the infill materials must reach, the more material you will use. Rubber crumb can be manufactured or processed to specification; three sizes of recycled rubber crumb are shown, to the left.

The most commonly produced rubber crumb is made from recycled tires. Countries, all over the world, have been specifying and using recycled rubber from tires for over 50 years.



The added resiliency and decreased abrasion to turf blades makes crumb rubber a preferred infill material for many artificial grass systems integrators.



System specifications may call for using either crumb rubber alone or a mixture of silica sand and crumb rubber; either applied in layers or blended and spread across the surfaces.

SBR and EPDM Crumb Rubber Infill materials come in a variety of sizes, shapes and color variants (black, black and white chips mixed).

[ASGi Global Health and Environmental Impact Studies, HERE.](#)

Proper Care and Grooming of Infilled Surfaces

It is very important for the longevity of your synthetic grass surfaces to properly care for them or they will soon show the ravages of the abuse they bear.

Every several months it is important to “agitate” or brush the surfaces. This will help to revitalize the pile, bring small, foreign objects to the surfaces for removal and it will help to redistribute and “fluff” the upper surfaces. Never use metal bristles or tools on the surfaces—they may break or shred the blades, creating weakness or causing damage to the surfaces. Use of metal tools may also void your warranty!

Do you ever refill it?

Why might you have to re-infill a turf surface? Several factors come into play when considering how long infill will last. Traffic on the area, contamination from food or seeds, sloping (loss of materials from shedding), type of infill and turf used. Vertically draining turf seems to hold infill materials in place the longest. Non-draining, sand filled turf loses infill due to wind and rain and refreshing the surface may be an annual or semi-annual maintenance item.

The deeper the infill, the longer infill will last. Lower levels of materials are not directly exposed to heavy traffic, UV and weather, so they tend to break down slower than the upper level of materials. Sub-angular sand and crumbed rubber are affected by acid rain and freezing which can further materials

Clean the surfaces with a leaf blower and plastic leaf rake regularly to keep it free from organic debris. Trees and foliage that drop flowers, seeds or fruit upon the surfaces will require more attention. Most saps, fruit decomposition and organic droppings can be removed easily by spraying with vinegar and rinsing with a gentle shower of water, to wash and dilute the sugars and wash them away.

For animal feces and urine, special care must be taken as animal droppings can contaminate other surfaces. Use enzyme cleaners, vinegar or other house-hold, biodegradable deodorizers and sanitizers for best results. Use 1 gallon per 500 square feet of area and completely saturate the blades and infill. Rinsing the area the area within a few hours can help distribute these products deep into the surfaces. If you are experiencing odors, retreat the area more regularly and

damage due to cracks and crumbling. When these materials break down, a loss of resiliency in the surface and compaction of the infill will be evident. Vacuuming out the top layers of infill and refreshing the surfaces with new product will help recapture almost all of the original feel of the area.

On slopes, turf rows should be installed across the slope, not up and down, to help hold in the infill materials. Infill can be lost due to shedding from wind, rain and other traffic. Lost infill materials should be reclaimed or replaced and reapplied to the surfaces for best results.

Customers with TEE lines and chipping areas should be provided additional infill materials to properly maintain their infill depth over time and use.

Glossary (check online at asginstallers.com for a comprehensive industry glossary)

Infill or Top Dressing:

Job materials, typically granules of silica sand or crumbed rubber used to add ballast (weight) to the turf surfaces and to provide a “root system” to the base of the blade fibers to help them to stand up and provide resiliency to the surface.

Blooming Turf: A stiff carpet rake and elbow grease or gas-powered broom/brush is used across the unrolled turf surfaces. The brushing will break up or pick up individual blades from the turf surfaces, standing (or blooming) the blades upright.

Sub-Angular Grains:

Sub-angular granules of material will be oddly shaped with sharp edges and points to each grain.

Abrasiveness:

The abrasiveness of infill products can be tested and the standard test that is run to determine this is ASTM F 1015.

Abrasiveness of infill materials is important to help determine how much effect the infill will have on the wear of the turf fibers.

Resilient—Resiliency:

Used in conjunction with discussions of turf, this term refers to the springy feel of the turf surfaces and may also refer to the capability of the turf fibers to spring back up vertically after heavy traffic.

Mesh:

The term mesh refers to the size of the grain of material you are using. Typically, 20 and 30 mesh products are appropriate sizes for infill materials. A 10 mesh would be too large of a granule and 40 or larger would be too fine a grain—60 is almost talc-like.

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