

TURFACE—WHAT IT DOES

Soil Amendment for Golf Courses

J. R. David Palmer, Supaturf Products Ltd.

Surface is a calcined mineral aggregate designed to provide a constantly friable soil—year after year.

Friable soil produces many benefits:

1. Resilient turf.
2. Faster and more complete water infiltration.
3. Free air movement.
4. Lower maintenance cost.
5. Greater control over disease.
6. Deeper, healthier root growth.

A well conditioned turf is better able to resist wide variations in weather conditions.

Prior to Surface, soil additives often overcame only a few of the conditions which cause poor turf, and they sometimes compounded these problems because of their physical properties. There was no single product that could economically promote better turf growth in all kinds of weather without difficulties.

There are five major turf problems which usually plague turf managers:

1. Poor drainage.
2. Inadequate ventilation.
3. Shallow root growth.
4. High maintenance cost.
5. Disease.

During the many years of field testing and commercial use throughout the country, Surface has proven itself in minimizing, if not completely eliminating, all of these conditions.

1. Poor Drainage

This problem usually results from the compaction of the top three or

four inches of soil. Compaction is either immediately noticeable or develops gradually. Immediate compaction usually results from the use of unsuitable soil mixtures. Gradual compaction indicates organic decomposition from traffic and weathering. Using organic materials as top dressing to overcome this difficulty will at best serve only as a temporary cure. In a short period of time, due to decomposition of the organic matter, the compaction problem returns to a greater degree. Various grades of sand are often used as top dressing to provide friable soil.

Although these inorganic materials will not decompose, their use results in poor resiliency, high leaching rates, and low water holding capacity of the treated soil. Where bad design or preparation causes drainage difficulties, a poorly designed area will drain better if the soil is not compacted. Friable soils on sloping areas will allow water to penetrate the soil rather than run off and collect in low areas.

Surface is recommended for use as a top dressing on established turf, or as part of the soil mixture during construction, to aid in maintaining constantly loose soil. Surface, whether wet or dry, will not compact, cake or break down to smaller particles. This is because Surface particles are angular, not flat, round or square. Being of varying size, a continuous network of particles is formed, which serves as a "separator" in sticky, gummy soils. In many years of testing.

Turface survived many freeze-thaw periods. Leaching tests run in Wyandotte Research Laboratories verified the breakdown resistance. No ingredients were found which would adversely affect plant life.

2. Inadequate Ventilation

Healthy root structure requires oxygen. Compacted soil will not allow air to reach the roots. Field research has proven that roots will grow toward available oxygen in the same manner as they grow toward moisture. Soils that highly restrict air penetration from above, and movement below, the surface will become stagnant. The green is therefore susceptible to infection and poor root growth. Greens properly built and maintained with Turface breathe more freely because the soil remains loose.

It is important to examine the top one or two inches of turf periodically for compaction. Continual traffic and decomposition of cuttings and other organic matter will form an impervious layer. Since oxygen and moisture must penetrate this layer to reach deeper roots, it is important to reduce the degree of compaction. Periodic top dressing with Turface will allow freer and deeper movement of air in and out of the soil.

3. Shallow Root Growth

This mainly occurs from the inability of water and oxygen to reach and remain at the deep roots. On a hard, compacted green, the water will remain near the surface. Water penetration in compacted soil may be as low as 0.1 inches per hour. During a rainy season, or when manually watered, the shallow roots take all of the water capable of penetrating such a surface, and deep roots will not develop or survive, since there is no moisture available to them. Because of rapid evaporation near the surface, the shallow roots need frequent watering. Soil conditioned with Turface

allows water to penetrate quickly to greater depths. Turface absorbs its own weight in water. This means that moisture will remain deep in the soil long after the soil near the surface has dried out. A friable soil with a material that will not decompose, will permit freer air movement and retain moisture.

4. High Maintenance Cost

Labour, fertilizers, equipment, and the use of chemicals are the principal cost factors in maintaining turf. Of these, labour is the most expensive. The presence of even small amounts of Turface in soil effects definite savings in labour.

A Turfaced soil will take approximately twice the water in half the time that a standard golf course mixture will. Watering time is thus cut by more than half. Repair of damaged turf is easier with the loose Turfaced soil, and recovery is definitely quicker. Labour is saved because of less ball damage on greens, less scuff damage caused by spikes, and quicker turf recovery of heavily played areas such as tees.

Because Turfaced soil resists infection, the cost of applying preventive chemicals is normally reduced.

5. Disease

Many soils incorporate large amounts of sand, which is used because it assists in drainage. Sand does not, however, hold or absorb water, which is so beneficial for healthy root structure. Turf having healthy root structure fights disease, whereas weak root structure is more susceptible to disease. Disease is more common under high moisture, drought, or stagnant conditions.

Turface provides faster drainage than sand, and also holds enough moisture to minimize drought. Stagnant conditions prevail when excessive

moisture is trapped in the soil. Since Turface works to control moisture, it will assist in the prevention of disease due to stagnation.

In summarizing, Turface produces a better turf structure because it works toward satisfying all the conditions that must be met for good root growth. It does this by delivering moisture to deep roots, allowing the soil to breathe and providing excellent drainage.

On golf courses, Turface is widely used as a top dressing material following aeration of the greens. Maximum effectiveness is obtained by top dressing with straight Turface, although Turface may also be incorporated into any top dressing mixture.

Turface is a montmorillonite clay. It is mined from a specially selected earth deposit in Mississippi. Obtaining special cuts of material from the mine is only the first step of many important operations. The crude clay is crushed and ground only after analysis verifies top quality material. Materials of uniform particle size are then fed to a calciner. A calciner is an inclined, revolving cylindrical chamber, flame fired to temperatures above 1300 F. The humidity in the calciner is exactly controlled. The crude clay enters at the top and leaves at the lower end. It has been subjected to constant high temperatures over a definite period of time. Through the use of specially designed ribs in the calciner it is possible to get a uniform degree of calcination. Careful control of particle size, temperature, time and tumbling action is absolutely necessary to produce a product that will absorb moisture, allow free air movement, and not disintegrate while in the soil. High temperature calcining over a short period of time is not enough to ensure complete calcination. Also, if the particle size varies, it is possible to over-calcine small particles and under-calcine large particles. Following the calcining procedure,

Turface is reground and screened to ensure the exact particle size and distribution. Finally, the product is packaged in attractive 50 lb. bags.

HOW TO USE TURFACE FOR TURF CONSTRUCTION

When new greens or tees are constructed, Turface is an excellent choice as a component of the topsoil mix, usually replacing part of the sand. Where practical, it is desirable to condition the top six inches of soil with approximately 20% to 25% Turface (by volume), depending upon the physical structure of the soil.

It is important to distribute the Turface evenly throughout the top several inches of soil; this is true whether Turfing or sowing. There are many ways of accomplishing even distribution. The following are suggested methods which have proven satisfactory:

A. Direct Application

Rototill or cultivate one bag of Turface per 10 square feet into the top 6 inches of soil (Soil is usually a mixture of sand, top soil and peat). At this rate, the top 6 inches of green surface will be conditioned with approximately 22% Turface. After levelling, turf or sow.

B. Pre-Mixed Soils

With the use of a mechanical soil mixer, mix 5 bags of Turface with each cubic yard of soil. One cubic yard of the mix will cover 54 square feet of the green surface to a 6 inch depth, or 27 square feet to a 12 inch depth. The soil will be conditioned with approximately 21% Turface.

HOW TO USE TURFACE FOR TURF MAINTENANCE

Since compaction is always a problem on greens, a good maintenance programme is important. Top dressing with Turface will help to ensure a friable soil, good drainage, and optimum root development of the turf.

A. Straight Top Dressing

Aerify, remove plugs, and apply Turface through a spreader, using one bag for each 250 square feet of surface area.

With reverse side of rake, push-broom, or drag screen, work Turface into turf and aerification holes.

Verticut machine may be used before Turface application, to provide additional avenues of entry into the soil. Turfacing is recommended twice or more a year (once a year for Turface-built greens).

B. Surface Levelling by Top Dressing

Greens develop low areas which need to be relevelled. A soil mixture similar to that in the green plus Turface can be used to facilitate excellent drainage.

Premix 1/3 Turface with 2/3 soil. Soil may be mixture of sand and peat or sandy loam. Verticut area to remove thatch, and apply Turface mix to area in regular levelling manner.

FORMULAS

The following formula is used to determine the number of Turface bags necessary for construction when depth of mix in inches, per cent Turface, and square feet are known:

Bags = $.0007 \times \text{Depth} \times \text{Per Cent} \times \text{Square Footage}$.

Example

5000 sq. ft. green

15% Turface desired to a 4" depth.

Bags = $.0007 \times 4 \times 15 \times 5000$

Bags = 210

If, however, a greenkeeper wishes to put so many bags into a green to a certain depth, the following formula is used to determine the percentage Turface in the mixture:

Percentage Turface in Mixture = $1550 \times \text{Bags} \div \text{Depth} \times \text{Square Footage}$.

Example

150 Turface Bags

6000 sq. ft. green

4" depth to be conditioned

Percent Turface in Mixture

= $1550 \times 150 \div 4 \times 6000$

= $232,500 \div 24,000$

= 9.7 or 10%

This means that if 150 bags of Turface are worked into a 6000 sq. ft. green, the top 4 inches of soil will be conditioned with 10% Turface, by volume.

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