

TURFMatrix™

A Superior Soil Amendment

Amending Soils for Turf

Lawns

Golf Greens

Golf Fairways

Soccer Fields

Baseball Fields

Football Fields

Tennis Courts

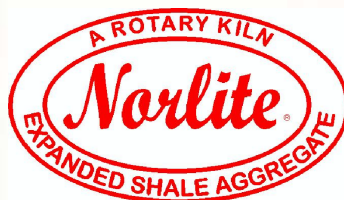
Polo Grounds

City Parks

..... *Everywhere
you grow!*



Rooted In Excellence



INTRODUCTION

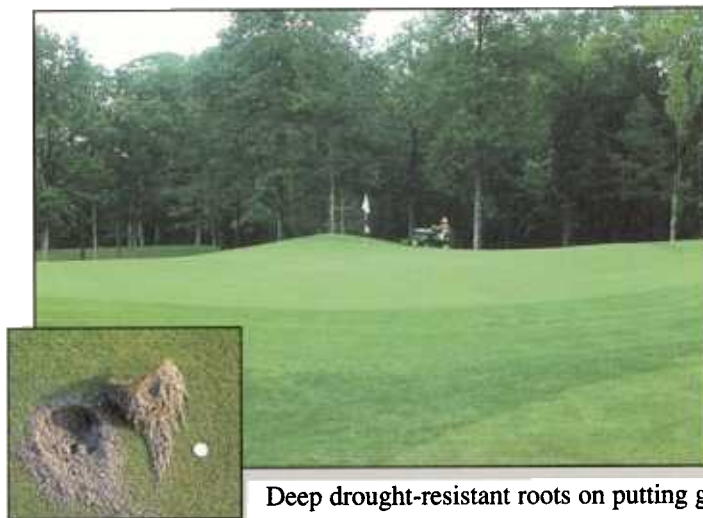
With the advent of sports turf, golf greens, and professional lawn care, the science of turf grass management has taken a giant step forward. All healthy turf has one thing in common: *a good root system*. Roots that can move through the soil freely help grass plants establish and recover more quickly than those that are placed in compacted and poorly drained soils. Compacted soils force roots to grow very near the soil surface. This greatly reduces drought resistance and increases the possibility of diseases from poor drainage. It is generally understood that to achieve healthy turf, it may be necessary to amend soils with materials that promote strong root development. Properly amended soils will yield strong, healthy turf that requires less maintenance. It not only protects your investment, it enhances it.

A GOOD SOIL PROFILE

Soil is a fragile growing medium consisting of three components: solid particles, water and air. It is necessary to maintain a careful balance of these elements to establish a good soil profile. Generally speaking, a good soil profile is approximately 25% water, 25% air, and 50% solid particulate matter. However, when soils are compacted the profile becomes unbalanced as a result of changes in the soil structure. Solid particles are pressed together eliminating space for the water and air. With less pore space, soils become too dense for the movement of water and for the exchange of air and nutrients. With this compacted soil condition, the favorable environment for the beneficial microbial activity necessary for a healthy growing medium is lost.

SOIL AMENDMENTS

Soils are not generic in structure, so why should the methods of conditioning them be? By providing adequate drainage, reducing nutrient loss,



Deep drought-resistant roots on putting green

improving moisture retention, enhancing soil resiliency, and increasing resistance to compaction, a balanced soil can be achieved. Organic amendments are essential for healthy balanced soils, but they absorb water and without adequate air and drainage can contribute to the growth of harmful fungi and bacteria. Historically gardeners added grit or sand to the soil to help aerate it. However, over time the soil becomes compacted around these solid particles, the pore space is reduced, and the air supply to the roots is cut off. Some sands can also leach minerals into the soil and affect nutrient balance. Products such as vermiculite, perlite, foam beads, and partially calcined clays are marketed to aerate soil. As part of the soil mix, all these additives tend to break down over time, crush, or get carried away by wind or water. Only **TURFMatrix™** can provide an essentially permanent, single application solution.

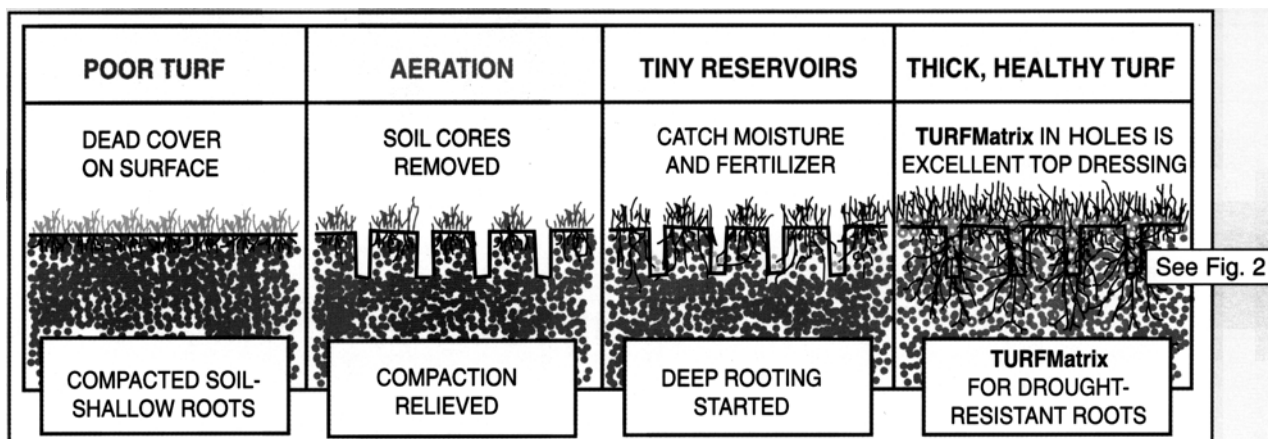


Fig. 1 - Mechanical Aeration.

Topdressing Existing Turf * (Fig. 1)

Topdressing with **TURFMatrix** on existing turf can be applied under two conditions. First, and best, is following mechanical aerification. The **TURFMatrix** is applied to closely cropped and aerated turf surface to form a 3/8" to 1/2" uniform layer. The applied material can then be raked into the 2" to 4" deep core holes, or simply allowed to drop into the holes without raking. Either way, **TURFMatrix** ultimately becomes a permanent addition to the soil profile.

Another way to apply **TURFMatrix** topdressing is to spread it evenly in a 3/8" to 1/2" layer on closely cropped, non-aerated turf. Though not as effective as when combined with mechanical aeration, the **TURFMatrix** will eventually work into the thatch layer and improve drainage, fill low spots, and help provide a more level surface. Additionally, it helps promote the microbial action which breaks down thatch and organic matter to improve nutrient availability to the grass plants.

New Lawn Construction*

Heavy Clay Soils? Soils that consist of tiny plate-like natural clay particles compact easily and lack pore spaces for air, water and humus. Natural clay particles hold moisture and further reduce the amount of available air pore space. Breaking up clay soil to depths of 8" to 12" is the first and most physically demanding step.

Soil Preparation: **TURFMatrix** is best incorporated into the soil before seeding or placement of sod. Apply the recommended rate of fertilizer, along with any required soil amendments such as lime or gypsum, to the surface and till or disk the soil as deep as possible before applying **TURFMatrix**. Next, spread **TURFMatrix** evenly on the surface to a depth of 1" to 2". The addition of a 1/2" to 1" layer of organic matter, preferably a good compost, at this time is also recommended. After **TURFMatrix** and compost have been spread, till or work it into the soil to a depth of 6" to 8". Then, rake the soil smooth. The soil is now prepared for seed or sod placement before the next rain or watering cycle. **Topdressing and new lawn construction material is normally a minus 1/4"-graded material. However, you should contact your local supplier for specific grading information.*

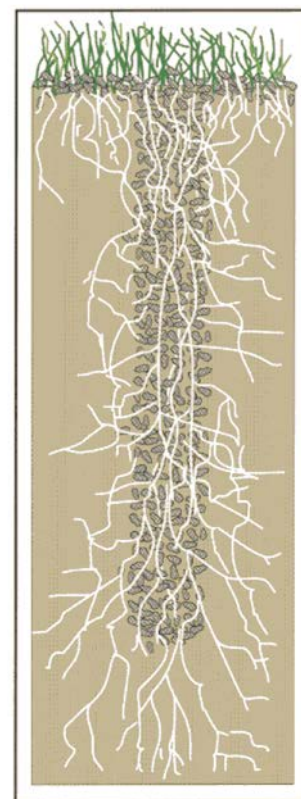


Fig. 2 - Mechanical Aeration with **TURFMatrix** top dressing

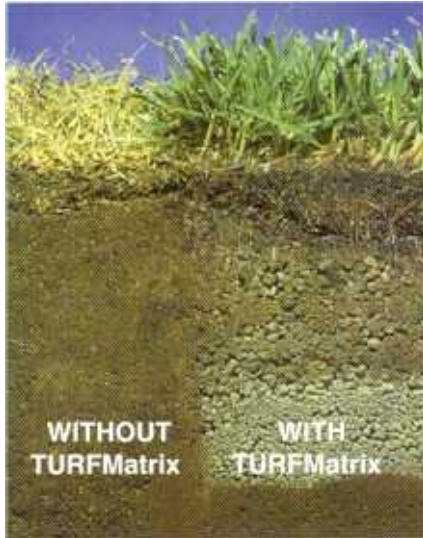


Fig. 3 - Soil with and without **TURFMatrix** structural soil

STRUCTURAL SOIL CONSTRUCTION

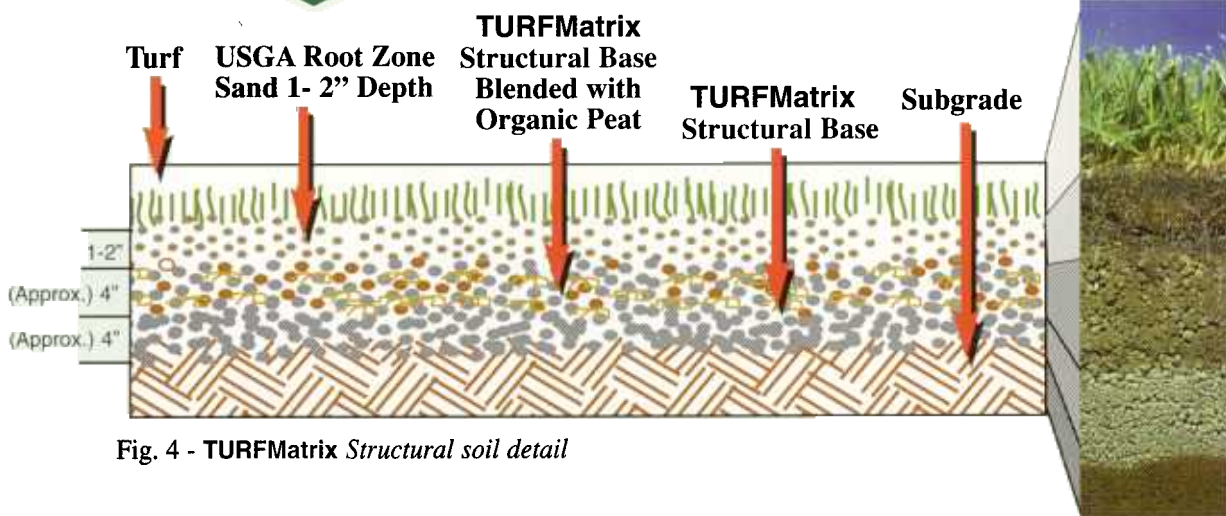


Fig. 4 - **TURFMatrix** Structural soil detail

Structural Soil Construction (Fig. 3 and Fig 4)

After the subgrade is uniformly compacted to 95% of its maximum dry density, the 3/8" to 1/4"-size **TURFMatrix** can be placed in uniform lifts over the entire area, and compacted (using a vibratory plate compactor) to provide a finished depth of about 8". A blend of **TurfMatrix** and organic peat is often used to create the upper half of this compacted layer as shown in Figure 4. A 1" to 2" layer of USGA root zone mix is then placed on top of the compacted **TURFMatrix**. It is now ready for seed or a sand-based sod. If the subgrade is impervious to water, a drainage system may be required. Once the turf is established, the system will support a quality lawn, and, in the event of an emergency, a fire truck, crane or other heavy equipment.

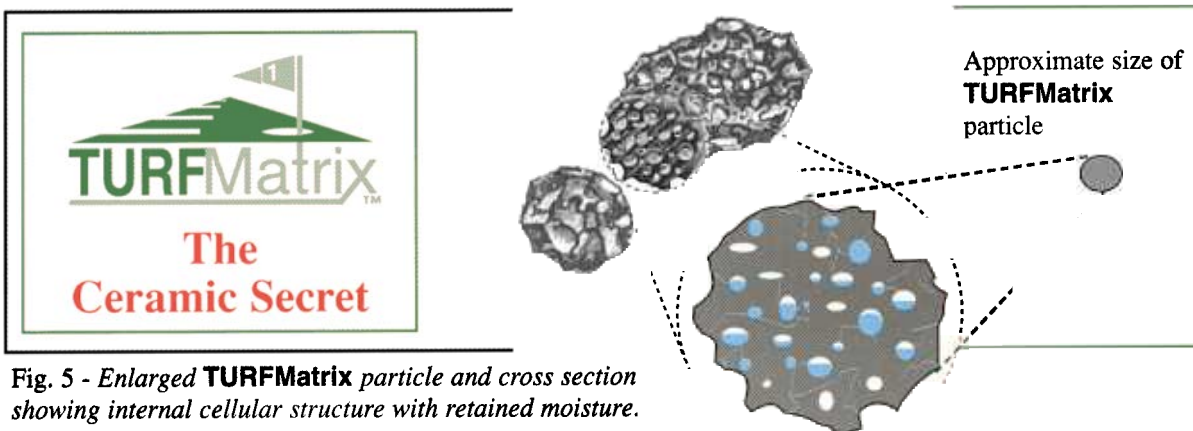


Fig. 5 - Enlarged **TURFMatrix** particle and cross section showing internal cellular structure with retained moisture.

WHAT IS **TURFMatrix**™?

TURFMatrix is a ceramic material produced by expanding and vitrifying specially selected natural shale, clay, or slate material in a rotary kiln at temperatures in excess of 2000° F. This process makes **TURFMatrix** agriculturally sterile and environmentally inert. It is not a chemical.

TURFMatrix is a non-toxic, generally neutral pH, absorptive granule made from natural material (Fig. 5). It is dimensionally stable and will not degrade or compress like other soil conditioning products. **TURFMatrix** does not need to be re-applied year after year.

HOW **TURFMatrix**™ WORKS

The porous, cellular nature of **TURFMatrix** helps manage water and fertilizer use, reduce compaction, increase soil porosity and maintains soil temperature. Because it has cation-exchange-capacity, **TURFMatrix** reduces nutrient loss through leaching. It retains moisture during dry periods and slowly releases it along with any soluble nutrients for the plant roots. **TURFMatrix** also helps drain and aerate wet soils and provides an environment suitable for beneficial microbial action. This makes it an excellent addition to compostable materials and enhances the composting process.

GIVE YOUR TURF A HEAD START

So how are healthy soils achieved? The use of **TURFMatrix**, or any other soil amendment, alone does not guarantee the success of a turf or lawn system. Soil make-up, climate, application technique, grass type and follow-up maintenance are also factors. However, the process of optimizing the potential of your soil is begun by amending it with **TURFMatrix**. It gives your soil and turf a head start, and a much greater chance for a spectacular finish with a stronger, thicker, healthier stand of grass.



Courtyard at Duke University Medical Center



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For additional reference, see the following publications:

- ASTM D 5268 - 92 (Reapproved 1997): *Standard Specification for Topsoil Used for Landscaping Purposes*
- ASTM D 5883 - 96: *Standard Guide for Use of Rotary Kiln Produced Expanded Shale, Clay or Slate (ESCS) as a Mineral Amendment in Topsoil Used for Landscaping Purposes*
- ESCSI Publication No. 7600: *Expanded Shale, Clay and Slate – A World of Applications . . . Worldwide*
- ESCSI Publication No. 8600: *Introducing the Friendly Material: Rotary Kiln Produced Lightweight Soil Conditioner*
- ESCSI Publication No. 6600: *Rotary Kiln Produced Lightweight Aggregate for Geotechnical Applications*



SOILMatrix: *For amending soils in containers and planting beds for flowers, shrubs or other landscaping plants (Not covered in this brochure)*



TURFMatrix: *For amending soils to promote thick, healthy, drought resistant turf and reduce maintenance requirements*



TREEMatrix: *For amending soils to promote healthy tree growth and reduce potential for root damage to pavement or other surface structures (Not covered in this brochure)*

For additional information, contact your local supplier.



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