

Example Grasses and Root Zone Spec

Profile™ Porous Ceramics Specifications with Sand Based Root Zones

August 4, 2004

I. Root Zone Components

A. Materials

Root Zone Sand — The sand shall be a silica sand, non-calcareous, clean and processed and meet the following particle size criteria. If the sand described above cannot be economically found, consult with the Architect to approve other choices of sands.

	Sieve Mesh	Diameter of Sieve (mm)	Allowable range % retained
Gravel	10	2.00	Less than, equal to 3%
Very Coarse	18	1.00	5 – 10%
Coarse	35	0.50	20 – 25%
Medium	60	0.25	38 – 45%
Fine	100	0.15	15 – 22%
Very Fine	270	0.05	1.5 – 6%
Silt		0.002	1.5 – 5%
Clay		Less than 0.002	1 – 2%
Suggested Sand Characteristics			
Fines Modulus between 1½ to 2½			
Coefficient of Uniformity 2.5 to 3.5			
Sand Shape should be Sub Angular to Sub Rounded			

Submit samples to testing agent for analysis to assure sand meets these particle size distribution ranges.

- B. Profile Porous Ceramic will be the main amendment used to develop a sand based root zone. Only Profile, produced by PROFILE Products LLC, shall be used. No substitute inorganic amendment products will be used.
- C. Root Zone Mixture — A two-gallon sand sample meeting the particle size distribution ranges stated previously will be sent to:

Tifton Physical Soil Testing Laboratory, Inc.
1412 Murray Avenue
Tifton, GA 31794

Instruct Tifton Lab to perform Analysis 1, Development of a USGA Putting Green Root Zone Mixture (Greensmix) on the sand sample, and 90:10, 85:15, and 80:20 Sand:Profile mixes.

The amount of Profile required will be dependent upon meeting the following root zone mix performance criteria:

Saturated Hydraulic Conductivity (Ksat) (in/hr):	15" (minimum)
Non-Capillary Porosity (percent):	23% (minimum)
Capillary Porosity (percent):	18% (minimum)
Water Retention at Field Capacity (percent):	13% (minimum)

If the capillary porosity and/or water retention minimums cannot be achieved by adding up to 20% Profile, then Analysis 1 will be repeated on 75:20:5 and 70:20:10, sand: Profile :sphagnum peat mixes. The mix containing the least amount of peat that meets the root zone mix performance criteria will be used.

Turfacer[®] Specifications with Native Soil Root Zones

Please find below our suggested specification for blending/incorporating Turfacer[®] Pro League[®] or MVP[®] into native soil applications.

In order to maximize the end result or finished athletic field playing surface, please find listed below points of consideration for bid specifications.

- The existing vegetation shall be sprayed with the non-selective herbicide glyphosate (trade name – Round Up[®]) at the manufacturer's recommended application rate, 10-14 days prior to the excavation of the existing 6 to 10 inches of the surficial layer of topsoil.
- The subsoil directly below the root zone (topsoil) mix should be loosened via a chisel plow or comparable piece of equipment to a depth of 6-8 inches. After this is accomplished, ALL construction equipment entering the area with in the running track shall be of track –type or crawler equipment. This will minimize the potential for compacting and creating hardpan zones within the soil profile. Exceptions are possible provided the ground pressure exerted by a rubber-tired piece of equipment is less than 25 pounds per square inch can be documented and architect signs off on each piece of proposed equipment.
- The subsoil surface grade should be reestablished to follow the contour of the desired finished grade. This will lessen the potential for perching and cross movement of water in the soil profile.
- The sod and thatch layer of the area should be stripped and properly discarded. Extra care shall be exercised to minimize the loss of the existing topsoil layer.
- During the excavation of the surficial layer of topsoil, extreme caution shall be used to prevent contaminating the top soil with the underlying subsoil. Core sampling prior to excavation to determine the range of topsoil depth is required.
- The excavated topsoil shall be stockpiled in a fashion, which promotes the natural shedding of rainfall, minimizing the potential for supersaturating the stockpiled topsoil.

These are not conclusive nor complete as actual specifications, but merely points that should be addressed (based upon experience) throughout your final bid specification.

Proposed Specification for Blending/Incorporating Turface MVP or Pro League Into the Stockpiled Topsoil.

The stockpiled topsoil shall be free of sticks, stones, and any other foreign materials prior to blending. The stockpiled soil and blended topsoil mix shall be screened and must pass through a 1½ inch opening. Excessive pulverizing or impact shattering of the soil is prohibited.

Contractor shall incorporate Turface Pro League into the stockpiled topsoil at a rate of 25% or an inclusion rate of 238 pounds of Turface Pro League per blended yard of finished topsoil mix. The finished topsoil mix shall be homogeneous in appearance, lacking any pockets or heavy concentrations of Turface Pro League.

The actual blending/incorporating shall be accomplished via a double-hopper blending/screening unit. The opening or gate on each feed hopper shall be adjustable to control the calibration and flow of materials

The stockpiled topsoil mix shall be inspected and approved prior to placing it back on the playing surface area.

Turf MVP (large particle) and Turface Pro League (mid-sized particle) are true soil conditioners. These products feature high porosity and particle stability, which in turn provide:

- Reduced compaction
- Enhanced vertical infiltration of water
- Increased absorption of excess water
- Permanent soil amendment (less than 5% degradation over 20 years)
- Promotion of soil aggregation
- Reduced divoting via a healthier and greater root mass
- Increase nutrient retention (CEC of 33 meq/100gm)
- Healthier soil by increasing and balancing soil porosity

Calculation Check Sheet Example for Turface in Native Soil

Assumed:

- Square footage within the running track is 58,000 square feet.
- Depth of final topsoil/Turf Pro League mix is 6 inches.
- Incorporation rate of Turface Pro League is 25% (volume-basis)

Final Topsoil Mix Needed

$(58,000\text{ft}^2) (.5 \text{ ft depth}) = 29,000 \text{ ft}^3$ of topsoil mix needed

$(29,000 \text{ ft}^3 \text{ topsoil mix}) \div (27 \text{ ft}^3/\text{Yd}^3) = 1,074 \text{ Yd}^3$ of topsoil mix needed

$(1,074 \text{ Yd}^3 \text{ topsoil mix}) (1.2 \text{ settling factor}) = 1289 \text{ Yd}^3$ of topsoil mix needed

Calculating Topsoil Mix Blend Needs

1289 Yd³ of Topsoil Mix needed
25% Incorporation of Turface Pro League
75% Stockpile Topsoil

$(1289 \text{ Yd}^3 \text{ of Topsoil Mix}) (.75) = 967 \text{ Yd}^3 \text{ Stockpiled topsoil needed}$

$(1289 \text{ Yd}^3 \text{ of Topsoil Mix}) (.25) = 322 \text{ Yd}^3 \text{ Turface Pro League needed}$

$(322 \text{ Yd}^3 \text{ Turface Pro League}) \div (2.1 \text{ Yd}^3/\text{Ton}) = 153 \text{ Tons of Turface Pro League needed}$

Baseball / Softball Infield Skinned Area Specifications

I. Skinned Infield Specifications

- A. Infield grade — The base lines should be level, and the rest of the infield should have a continuous grade from established contour lines at about a ½% grade. Water should flow off of the infield into an area out of play.
- B. Infield Skinned Area Mix — Infield skinned area shall be installed to a compacted depth of 6". Infield mix shall be pre-mixed and processed to approximate percentages of 60% sand, 20% silt and 20% clay mixture. All of the infield soil must be screened through a 3/8" wire screen and be free of rocks and debris. Submit samples and testing analysis to verify the sand silt and clay analysis to the Architect's representative prior to work commencement.

Turface® calcined clay should be tilled into the top 4 inches of the infield mix at a rate of 15% to 20%. (See installation below) After tilling, the infield should be compacted with a one-ton roller and checked to insure grade is still accurate. A ¼" of Turface MVP or Pro League should be spread on the surface of the finished infield as a topdressing.

Soil amendments: Add Turface MVP or Turface Pro League meeting the following specifications and installation recommendations:

Installation: Use the following formula to determine the amount of Turface to incorporate into the skinned infield mix. Infields should be amended at 15% to 20% by volume, 4 inches deep.

Use the following formula to calculate the amount of Turface needed to amend the soil:

Take the sq ft of the area to be amended multiplied by the depth in inches you wish to amend the soil and divide by 12 to obtain the cu ft of soil. Divide the cu ft of soil by 27 to obtain the cu yds of soil.

(sq ft x 4 inches / 12 = cu ft / 27 = cu yds)

Take the cu yds of soil and multiply by the % of amendment desired (20% = .2) = volume of amendment needed measured in cu yds.

(cu yds x % of amendment desired = cu yds of amendment)

Cu yds of amendment multiplied by the bulk density of the amendment equals cu yd in pounds. Take the pounds divided by 2000 = Tons required to amend the soil.

(cu yd x bulk density in pounds per cu yd / 2000 = Tons of amendment required)

For example: To determine the amount of Turface required to amend an infield skinned area of 9000 sq. ft. at a depth of 4 inches at a 20% volume:

9000 sq ft x 4/12 = 3000 cu ft divided by 27 = 111.11 cu yds of mix

111.11 cu yds x .2 = 22.22 cu yds of amendment

*22.22 X 945 lbs per cu yd = 20999 lbs divided by 2000 = **10.49 tons of Turface***

- C. **Pitcher's Mound** — Mound Mix shall be pre-mixed and processed to approximately 50% clay or higher mixture. The clay soil shall be free of rocks and debris. Build the entire mound with this clay mixture.

Landing area and table area

Excavate the landing area and the table of the pitchers mound and install Turface® MoundMaster® Blocks or Professional Mound Clay® as per the manufacturer's specifications. This high-density clay will help prevent holes and loose soil in these high stress areas.

- D. **Batters Boxes and Catchers Box** — The batters and catchers boxes should be constructed with a high quality clay such as MoundMaster blocks or Professional Mound Clay from PROFILE Products LLC. MoundMaster blocks should be installed one layer deep and the Professional Mound Clay should be installed to a depth of 4" to 6".

Turf Pro League Spec Sheet

Date: January 1, 2003

Product: Turf Pro League Sports Field Conditioner. Patent # 6,096,126. Be sure to specify Turf only, no equal. Turf is not a crushed brick or crushed stone product. It is manufactured specifically for sports fields.

Manufacturer: PROFILE Products LLC
750 Lake Cook Road, Suite 440, Buffalo Grove, IL, 60089
1-800-207-6457

Product Description: Must be an illite, montmorillonite & silica blend at 40% minimum and 60% minimum amorphous silica. Material must be processed in a rotary kiln operation at temperatures not less than 1200 degrees Fahrenheit. Product must then be screened and de-dusted.

Installation: Use the following formula to determine the amount of Turf to incorporate into the skinned infield mix. Infields should be amended at 15% to 20% by volume, 4 inches deep.

Use the following formula to calculate the amount of Turf needed to amend the soil:

Take the sq ft of the area to be amended multiplied by the depth in inches you wish to amend the soil and divide by 12 to obtain the cu ft of soil. Divide the cu ft of soil by 27 to obtain the cu yds of soil. ($sq\ ft \times 4\ inches / 12 = cu\ ft / 27 = cu\ yds$)

Take the cu yds of soil and multiply by the % of amendment desired (20% = .2) = volume of amendment needed measured in cu yds. ($cu\ yds \times \% \text{ of amendment desired} = cu\ yds \text{ of amendment}$)

Cu yds of amendment multiplied by the bulk density of the amendment equals cu yd in pounds. Take the pounds divided by 2000 = Tons required to amend the soil. ($cu\ yd \times \text{bulk density in pounds per cu yd} / 2000 = \text{Tons of amendment required}$)

For example: To determine the amount of Turf required to amend an infield skinned area of 9000 sq. ft. at a depth of 4 inches at a 20% volume:

$9000\ sq\ ft \times 4 / 12 = 3000\ cu\ ft \text{ divided by } 27 = 111.11\ cu\ yds \text{ of mix}$

$111.11\ cu\ yds \times .2 = 22.22\ cu\ yds \text{ of amendment}$

$22.22 \times 945\ lbs\ per\ cu\ yd = 20999\ lbs \text{ divided by } 2000 = \mathbf{10.49\ tons\ of\ Turf}$

Stability: Not to exceed 5% degradation (over 20 years) on ASTM-C88 Sulfate Soundness Test. Not to exceed 5% degradation (over 20 years) on Static Degradation Test.

Surface Pro League Spec Sheet

Date: January 1, 2003

Chemical Description: SiO₂ - 74%

Al₂O₃ - 11%

Fe₂O₃ - 5 %

All other chemicals equal less than 5% and include CaO, MgO, K₂O, Na₂O and TiO₂

Bulk Density lb/ft³: 34 ± 2

Color Appearance: Brownish/Red

Free Moisture% (At 150° C): 2.5% ± 2.5

pH: 7.0 ± 2.5

<u>Sieve Analysis:</u>	<u>Limits</u>	<u>Typical</u>
5 MESH	0.0 MAX	0.0
8 MESH	30.0 MAX	16.4
16 MESH	50.0 MIN	62.5
20 MESH	20.0 MAX	16.5
50 MESH	10 MAX	4.5
PAN	0.5 MAX	0.1

Turfacer MVP Spec Sheet

Date: January 1, 2003

Product: Turfacer MVP Sports Field Conditioner. Be sure to specify Turfacer only, no equal. Turfacer is not a crushed brick or crushed stone product. It is manufactured specifically for sports fields.

Manufacturer: PROFILE Products LLC
750 Lake Cook Road, Suite 440, Buffalo Grove, IL, 60089
1-800-207-6457

Product Description: Must be an illite, montmorillonite & silica blend at 40% minimum to 60% minimum amorphous silica. Material must be processed in a rotary kiln operation at temperatures not less than 1200 degrees Fahrenheit. Product must then be screened and de-dusted.

Installation: Use the following formula to determine the amount of Turfacer to incorporate into the skinned infield mix. Infields should be amended at 15% to 20% by volume, 4 inches deep.

Use the following formula to calculate the amount of Turfacer needed to amend the soil:

Take the sq ft of the area to be amended multiplied by the depth in inches you wish to amend the soil and divide by 12 to obtain the cu ft of soil. Divide the cu ft of soil by 27 to obtain the cu yds of soil. ($sq\ ft \times 4\ inches / 12 = cu\ ft / 27 = cu\ yds$)

Take the cu yds of soil and multiply by the % of amendment desired (20% = .2) = volume of amendment needed measured in cu yds ($cu\ yds \times \% \text{ of amendment desired} = cu\ yds \text{ of amendment}$)

Cu yds of amendment multiplied by the bulk density of the amendment equals cu yd in pounds. Take the pounds divided by 2000 = Tons required to amend the soil. ($cu\ yd \times bulk\ density\ in\ pounds\ per\ cu\ yd / 2000 = Tons\ of\ amendment\ required$)

For example: To determine the amount of Turfacer required to amend an infield skinned area of 9000 sq. ft. at a depth of 4 inches at a 20% volume:

$9000\ sq\ ft \times 4/12 = 3000\ cu\ ft\ divided\ by\ 27 = 111.11\ cu\ yds\ of\ mix$

$111.11\ cu\ yds \times .2 = 22.22\ cu\ yds\ of\ amendment$

$22.22 \times 945\ lbs\ per\ cu\ yd = 20999\ lbs\ divided\ by\ 2000 = \mathbf{10.49\ tons\ of\ Turfacer}$

Stability: Not to exceed 5% degradation (over 20 years) on ASTM-C88 Sulfate Soundness Test. Not to exceed 5% degradation (over 20 years) on Static Degradation Test.

Turf MVP Spec Sheet

Date: January 1, 2003

Chemical Description: SiO₂ - 74%

Al₂O₃ - 11%

Fe₂O₃ - 5 %

All other chemicals equal less than 5% and include CaO, MgO, K₂O, Na₂O and TiO₂

Bulk Density lb/ft³: 34 ± 2

Color Appearance: Brownish/Red

Free Moisture % (At 150° C): 1.50 ± .5

pH: 7.0 ± 2.5

MVP Sieve Analysis:

+6 mesh	15.0
+8 mesh	31.5
+12 mesh	18.9
+20 mesh	30.9
+30 mesh	3.1
+40 mesh	0.5
Pan	0.1