



Turf & Soil Diagnostics

January 26, 2017

Paul Hagy
Texas Sports Sands
702 Easy Street
Garland, TX 75042

TSD File #17010041

Enclosed are the results of the Pro Blend - Tan sample received by our laboratory on 1/23/2016. This sample was tested for potential use as bunker sand. These results are being compared to published bunker sand guidelines.

The penetrometer value of the sample is desirable. The crusting and setup values suggest that bunkers with this sand may require raking after rainfall or irrigation events. The infiltration rate of this sample meets the recommended minimum for well-drained bunker sand.

It is desirable for bunker sand used in green side bunkers to be compatible with the greens mix to reduce the risk of layering on the greens. The particle size results for this sample meet bunker and USGA particle size recommendations for greens. This suggests there should be a low layering risk if this sand is splashed onto most greens.

The results suggest that the sample has properties that are acceptable for use in bunkers. Despite this testing, bunker sand selection is highly subjective. Aside from playability, factors such as color and aesthetics are often weighed in the decision process. We recommend that golf course superintendents, pros, greens committee chairs, and any other interested parties visit a club with the sand in use. Play into and out of it to see how they like it.

If you have any questions or are in need of further assistance, please contact us. Samples are generally kept on the premises for 45 days after report date. Thank you for using Turf & Soil Diagnostics, Inc.

Sincerely,

Sam Ferro
President

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Date received Jan-23-2017
 Date Reported Jan-26-2017
 Facility Product Development

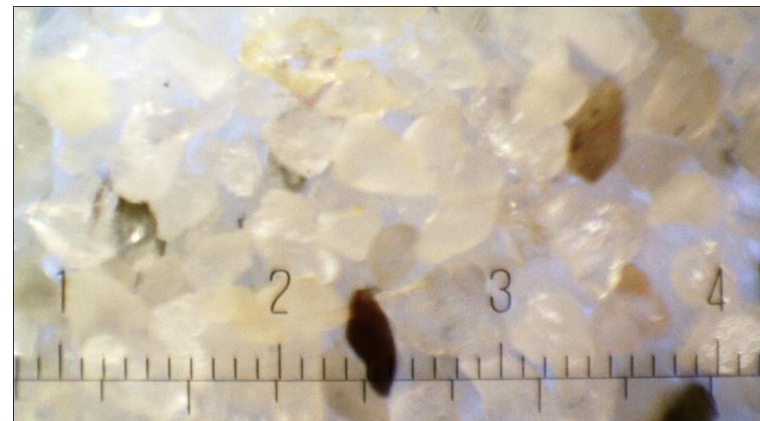
Bunker Sand Evaluation

Lab ID#	Sample Name	Dry Color	Wet Color	Penetrometer Value kg/cm ²
17010041-4	Pro Blend - Tan	10YR 8/3 Very Pale Brown	10YR 6/3 Pale Brown	2.7

Lab ID#	Sample Name	Shape Angularity	Shape Sphericity	Crusting	Set-Up
17010041-4	Pro Blend - Tan	Sub-Angular to Sub-Rounded	Medium	Slight	Slight

Bunker SOP

Samples were tested as received and comments pertain only to the samples shown.
 This report may not be reproduced in part, but only in full.
 Sample condition upon receipt was normal.
 Samples were received without a transmittal letter.



Photomicrograph of Lab ID 17010041-4 Pro Blend - Tan.

Reviewed by Sam Fero



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Particle Size Evaluation*

Lab ID#	Sample Name	% Sand 2.0 - 0.05 mm	% Silt 0.05-0.002mm	% Clay < 0.002mm	Gravel 4.0 (5)	Gravel 2.0 (10)	% Retained mm (US sieve)					V. Fine 0.05 (270)
							V. Coarse 1.0 (18)	Coarse 0.5 (35)	Medium 0.25 (60)	Fine 0.15 (100)	Fine 0.10 (140)	
17010041-4	Pro Blend - Tan	98.5	1.0	< 1.0	0.0	0.2	2.8	25.8	54.2	12.0	2.6	1.2
USGA Recommendations for Greens		≥ 92%	≤ 5% Silt	≤ 3% Clay	≤ 3% Gravel ≤ 10% Combined		≥ 60% Combined		≤ 20%	≤ 5%***		
Bunker Sand Guidelines ¹			≤ 3%		≤ 2%	≤ 15%	78 - 100%			≤ 5%		

¹ From Golf Course Management 54:64-70, 1986

² From USGA Green Section Record 36:9-12, 1998

Lab ID#	Sample Name	Uniformity Coefficient Cu	D15 mm	D50 mm	D85 mm	Shape Angularity	Shape Sphericity	USDA Textural Classification	Acid Reaction	Infiltration Rate** in/hr	Infiltration Rate** cm/hr	Bulk Density g/cc
17010041-4	Pro Blend - Tan	2.3	0.23	0.38	0.72	Sub-Angular to Sub-Rounded	Medium	Sand	Moderate	36.5	92.6	1.50
Bunker Sand Guidelines ²		-	-	-	-	-	-	-	-	> 20	> 50	-

*ASTM F1632 Method A & Determination of Size Factors SOP

**ASTM F1815 30 cm Tension

***Maximum of 10% combined on Very Fine Sand, Silt, and Clay fractions.

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Reviewed by Sam Fero