



Turf & Soil Diagnostics

October 28, 2016

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

TSD File #16100081

Enclosed are the results of the Tour Blend Bunker Sand sample received by our laboratory on 10-26-2016. 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 indicates a very low tendency to bury the ball. The crusting and setup values suggest that bunkers with this sand in place may not require significant raking after rainfall or irrigation events. The infiltration rate of this sample meets the recommended minimum of 20 in/hr 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 sand guidelines. The sand is finer than the USGA particle size recommendations for greens. The gradation suggests there may be a layering risk if this sand is splashed from bunkers onto coarser graded putting greens.

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 Oct-26-2016
 Date Reported Oct-28-2016
 Facility Product Development

Bunker Sand Evaluation

Lab ID#	Sample Name	Dry Color	Wet Color	Penetrometer Value kg/cm ²
16100081-3	Tour Blend Bunker Sand	White	10YR 8/1 White	3.9

Lab ID#	Sample Name	Shape Angularity	Shape Sphericity	Crusting	Set-Up
16100081-3	Tour Blend Bunker Sand	Angular to Sub-Rounded	Medium to High	None	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 16100081-3 Tour Blend Bunker Sand.

Reviewed by Sam Ferro



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30 cm USGA Physical Evaluation*

Lab ID#	Sample Name	Infiltration Rate* in/hr	Infiltration Rate* cm/hr	Bulk Density g/cc
16100081-3	Tour Blend Bunker Sand	35.1	89.0	1.57

*ASTM F1815 Saturated Hydraulic Conductivity (K-SAT)

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Reviewed by Sam Feno



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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. Coarse 1.0 (18)	Coarse 0.5 (35)	Medium 0.25 (60)	Fine 0.15 (100)	Fine 0.10 (140)	V. Fine 0.05 (270)
16100081-3	Tour Blend Bunker Sand	97.3	1.9	< 1.0	0.0	0.3	4.9	58.9	17.0	8.4	4.6	3.6
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

Lab ID#	Sample Name	Uniformity Coefficient Cu	D15 mm	D50 mm	D85 mm	Shape Angularity	Shape Sphericity	USDA Textural Classification	Acid Reaction	pH [‡] 1:1	Combined Fractions < 0.10 mm
16100081-3	Tour Blend Bunker Sand	4.6	0.20	0.59	0.89	Angular to Sub-Rounded	Medium to High	Sand	Severe		5.9

*ASTM F1632 Method A & Determination of Size Factors SOP

[‡]ASTM D4972 w/ CaCl₂

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

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Reviewed by Sam Fero