



Turf & Soil Diagnostics



MATERIALS TEST REPORT FOR
Les Sols Champlain

REPORT TO: Les Sols Champlain
Alain Marchand
1111 Cabane Ronde
Mascouche, QC J7K 0P2, Canada

DATE RECEIVED: Aug-24-2015
REPORT DATE: Aug-27-2015
CONDITION OF SAMPLE: Normal

PARTICLE SIZE (ASTM F1632)

Lab ID#	Sample Name	Soil Separate* %			Sieve Size / Sand Fraction Sand Particle Diameter % Retained					
		Sand	Silt	Clay	No. 10 Gravel 2.0 mm	No. 18 V. Coarse 1.0 mm	No. 35 Coarse 0.50 mm	No. 60 Medium 0.25 mm	No. 100 Fine 0.15 mm	No. 270 V. Fine 0.05 mm
40724-1	80/20 Greens Mix	97.6	< 1.0	1.4	0.4	6.9	38.6	45.4	5.7	1.0
USGA Recommendations for Greens		≥ 92%	≤ 5%	≤ 3%	≤ 3% Gravel ≤ 10% Combined		≥ 60% Combined	≤ 20%	≤ 5%***	

PARTICLE SHAPE / pH / PARTICLE SIZE PARAMETERS / INFILTRATION RATE

Lab ID#	Sample Name	Shape Sphericity	Shape Angularity	pH ¹ 1:1	Uniformity Coefficient Cu	D15 mm	D85 mm	% Organic Matter Dry Wt.**
40724-1	80/20 Greens Mix	Low to High	Angular to Rounded	5.6	2.2	0.28	0.87	0.88

*ASTM F1632 and Determination of Size Factors SOP

¹ ASTM D4972, method A, CaCl₂, 25 g sample used

**ASTM F1647 Method A

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

Samples were tested as received and comments pertain only to the samples shown.

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Samples were received with a transmittal letter.

Reviewed by *Dan Ferro*



Turf & Soil Diagnostics



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PHYSICAL PROPERTIES (ASTM F-1815)

Lab ID#	Sample Name	Particle Density ¹ g/cc	Bulk Density g/cc	Infiltration Rate* in/hr	Infiltration Rate* cm/hr	Total Porosity %	Aeration Porosity %	Capillary Porosity ² %	Organic Matter % Dry Wt. ³
40724-1	80/20 Greens Mix	2.65	1.51	19.6	49.9	42.9	28.2	14.7	0.88
USGA Recommendations for Greens		-	-	> 6	> 15	35 - 55	15 - 30	15 - 25	-

* Saturated Hydraulic Conductivity (K-SAT)

¹ ASTM D5550

² Determined at 30 cm tension

³ ASTM F1647 Method A

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Samples were received with a transmittal letter.

Reviewed by Sam Feno



August 27, 2015

Les Sols Champlain

TSD File #40724

Comments: The 80/20 Greens Mix sample was tested as received. These results are being compared to the current USGA recommendations for greens construction.

The mix has a small amount of silt and clay present, the amounts falling within USGA guidelines. The sand fraction is uniform in particle size, with most of the sand falling into the medium and coarse sand size fractions. The uniformity of the mix particle size is illustrated by the uniformity coefficient (Cu), this value falling within the typically preferred range of 2 to 3 for greens construction mixes.

The mix particle size meets USGA recommendations. The sand particle shape is mixed. The pH is low. There is a moderate amount of organic matter in the sample.

USGA performance testing indicates that the mix has saturated hydraulic conductivity (infiltration rate), total and aeration porosity that meet USGA guidelines. The capillary porosity meets USGA recommendations within a reasonable amount of error.

Total porosity is comprised of air-filled (aeration) and water-filled (capillary) pore space. Aeration porosity is made up of relatively large pores that conduct water under saturated conditions. When drained, they are filled with air, providing the oxygen that is necessary for root growth. Capillary porosity is made up of small pores that hold water against the force of gravity, retaining much of it for plant use. Ideally, a root zone mix would contain a nearly equal distribution of air and water filled pore space after free drainage.

The results suggest that greens, tees, or sports fields built with this mix should have good drainage and after free drainage should have acceptable aeration and water retention.

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