

Field Prescription Application Rates

October 2, 2015

Field ID:	SE08-07-06EPM	
Land Area Available (ha):		27
2016 Crop:	Winter Wheat	
2016 Target Yield:	80 bu/ac	
	lb/ac	kg/ha
Target Nitrogen recommended :	50	56
Fertilizer Phosphate (P2O5) Recommended:	20	22.4
1 x P2O5 Crop Removal @ target Yield:	25	28
2 x P2O5 Crop Removal @ target Yield:	50	56

Plant Available Nutrients Soil Test Data			
Sample ID	SE-8 003 N 0-6N	SE-8 003 6-24N	
Sample Depth	0-15 cm	15-60 cm	Total Available
Units	mg kg <sup>-1</sup>		kg ha <sup>-1</sup>
Available Nitrate-N	10.0	7.5	65
Available Phosphate-P (Olsen)	22.7		45
Available Potassium	232		464
Available Sulfate-S	1000	800	6,800

Steinbach Biosolids Characteristics and Analysis

Parameter Name	Parameter Description	Unit	Biosolid Analysis (Cell 2)
Estimated Biosolid Volume (+ 10% safety volume)	In-field	m <sup>3</sup>	878
Specific Gravity	As Received	kg L <sup>-1</sup>	1.03
Estimated Biosolids		tonnes	904
Dry tonnes biosolids available (=wet tonnes x %solids)	Dried Basis	tonnes	77
Moisture	As Received	%	89.80
Total Solids	As Received	%	8.80
Total Volatile Solids	Dry Basis	%	30
Organic Matter	Dry Basis	%	17.00
Mineral Content	Dry Basis	%	83.00
Total Organic Carbon	Dry Basis	%	2.00
C:N Ratio	Dry Basis	x:1	17.24
C:P Ratio	Dry Basis	x:1	4.34
N:P Ratio	Dry Basis	x:1	0.25
pH	Saturated Paste		6.87

Total Kjeldahl N	% Dried Basis	%	0.12
Total Kjeldahl N	Dried Basis	mg kg <sup>-1</sup>	1,160
Total Kjeldahl N	Dried Basis	kg Tonne <sup>-1</sup>	1.16
Ammonium - N	Dried Basis	mg kg <sup>-1</sup>	397.00
Ammonium - N	Dried Basis	kg Tonne <sup>-1</sup>	0.3970
Available Nitrate	Dried Basis	mg kg <sup>-1</sup>	-
Available Nitrate-N	Dried Basis	mg kg <sup>-1</sup>	-
Available Nitrate-N	Dried Basis	kg Tonne <sup>-1</sup>	-
Total Phosphorous	Dried Basis	mg kg <sup>-1</sup>	4,610

Amount of Biosolids Nutrient Available to Crop

Organic N (=TKN-ammonium N)	Dried Basis	mg kg <sup>-1</sup>	763.00
Organic N	Dried Basis	kg Tonne <sup>-1</sup>	0.76
Method of Application:			Injections
Anticipated Weather			Cool/dry
Anticipated Volatilization (%)	incorp within 1 days		15
Available Organic N	Dried Basis	kg Tonne <sup>-1</sup>	0.19
Ammonium nitrogen available	Dried Basis	kg Tonne <sup>-2</sup>	0.34
Total available nitrogen (Year 1) (@25%)	Dried Basis	kg Tonne <sup>-1</sup>	0.53
Mineralization N Year 2 (@12%)	Dried Basis	kg Tonne <sup>-1</sup>	0.09
Mineralization N Year 3 (@6%)	Dried Basis	kg Tonne <sup>-1</sup>	0.05
Total Phosphorus	Dried Basis	kg Tonne <sup>-1</sup>	4.61
P <sub>2</sub> O <sub>5</sub> equivalent	Dried Basis	kg Tonne <sup>-1</sup>	10.60
Total Available P2O5	Dried Basis	kg Tonne <sup>-1</sup>	5.30

Application Rate based on Nitrogen				Land Area Required (Ha)
Nitrogen Based Application Rate	Dried Basis	tonnes ha <sup>-1</sup>	106.02	1
Amount of Available P2O5 applied	Dried Basis	kg ha <sup>-1</sup>	562.07	
P2O5 Application check		%	2,509.23	
Application Rate based on Phosphorous (1xCR)				Land Area Required (Ha)
Total Phosphorus Based Application Rate	Dried Basis	tonnes ha <sup>-1</sup>	5.28	15
Amount of Nitrogen applied	Dried Basis	kg ha <sup>-1</sup>	2.79	
Additional Nitrogen required		kg ha <sup>-1</sup>	53.21	
Application Rate based on Phosphorous (2xCR)				Land Area Required (Ha)
Total Phosphorus Based Application Rate	Dried Basis	tonnes ha <sup>-1</sup>	10.56	7
Amount of Nitrogen applied	Dried Basis	kg ha <sup>-1</sup>	5.58	
Additional Nitrogen required		kg ha <sup>-1</sup>	50.42	

Selected Application rate based on:		2xCR	P2O5
Selected Application rate based on P2O5	Dried Basis	tonnes ha <sup>-1</sup>	5.28
		tons ac <sup>-1</sup>	2.38
	Wet	tonnes ha <sup>-1</sup>	60.02
		tons ac <sup>-1</sup>	27.01
		L ha <sup>-1</sup>	27,818
	igal ac <sup>-1</sup>	2,476	
Estimated Biosolids Volume Applied	Wet	Tonnes	1,620
Estimated Biosolids Volume Remaining	Wet	Tonnes	717

Notes

Available Ammonium N - Volatilization loss associated with different application methods (0% with Injection)

Organic N - TKN - Ammonium N

Available Organic N - Organic N x 0.25/year 1

Mineralization of Year 2 = 12%, Year 3 = 6%

Plant Available Nitrogen= (NO3-N)+Volatilization factor (NH4-N)+Organic N Mineralization

Phosphorous Total and Olsen methods.

\* See Estimates of Ammonium-N Retained After Biosolids application

C:N exceeds 30:1, N becomes a limiting nutrient for decomposer organisms, and this can reduce the rate of decomposition and results in N immobilization

C:P ratio between 200:1 and 300:1, mineralization and immobilization balance each other to result in no net release of P from the decomposing manure. When C:P is below this range, P is released.

When animal and municipal wastes have N:P ratios ranging from 1:1 to 1:2 are applied based on N rates on soils, over time P will accumulate