

Table 8b: Manure Application Rate Calculation Worksheet¹ Based On Solid Manure

Field I.D.: _____ Crop: _____ Target Yield: _____			
Step 1. Target Nutrient Rate			Units ^[2]
Nitrogen (based on soil test recommendation)	(A)	90	kg/ha
Phosphorus (as P ₂ O ₅): 2x Crop Removal	(B1)	60	kg/ha
Phosphorus (as P ₂ O ₅): 1x Crop Removal	(B2)	30	kg/ha
Other:	(B3)		kg/ha
Step 2. Manure Test Data			
Total Nitrogen	(C)	6.0	kg/t
Ammonium Nitrogen	(D)	2.1	kg/t
Organic Nitrogen = (C) - (D)	(E)	3.9	kg/t
Phosphorus	(F)	2.4	kg/t
P ₂ O ₅ = (F) x 2.3	(G)	5.5	kg/t
Step 3. Amount of manure nitrogen available to crop:			
Application method	Incorporated within 1 day		
Volatilization losses due to application method (Table 6)	(H)	25%	
Ammonium nitrogen available = (D) x [100-(H)]% = 2.1 x 0.75 = 1.6	(I)	1.6	kg/t
Organic nitrogen available to the next crop = (E) x 0.25 = 3.9 x 0.25 = 1.0	(J)	1.0	kg/t
Total available N = (I) + (J) = 1.6 + 1.0 = 2.6	(K)	2.6	kg/t
Total available N in spring = (K) x 100% = 2.6 x 1.0 = 2.6	(L)	2.6	kg/t
Total Available N in fall = (K) x 83% = 2.6 x 0.83 = 2.2	(M)	2.2	kg/t
Step 4. Application rate based on N requirements:			
Spring N-based Application Rate = (A) ÷ (L) = 90 ÷ 2.6 = 34.6 or Fall N-based Application Rate = (A) ÷ (M) = 90 ÷ 2.2 = 40.9	(N)	34.6	t/ha
Amount of P ₂ O ₅ applied = (G) x (N) = 5.5 x 34.6 = 190.3	(O)	190.3	kg/ha
P ₂ O ₅ balance ³ (using 1x crop removal) = (O) - (B2) = 190.3 - 30 = 160.3	(P)	+160.3	kg/ha
Step 5. Application rate based on P removal:			
2x crop removal P-based Application Rate ² = (B1) ÷ (G) = 60 ÷ 5.5 = 10.9 or 1x crop removal P-based Application Rate ² = (B2) ÷ (G) = 30 ÷ 5.5 = 5.5	(Q)	10.9	t/ha
Amount of available N applied in spring = (L) x (Q) = 2.6 x 10.9 = 28.3 or Amount of available N applied in fall = (M) x (Q) = 2.2 x 10.9 = 23.9	(R)	28.3	kg/ha
N balance ⁵ (N applied - N recommended) = (R) - (A) = 28.3 - 90 = -61.7	(S)	-61.7	kg/ha
Step 6. Compare N Rate (N) with P rate (Q):			
If soil test P is low to moderate (<60 ppm), apply manure at N rate (N)		35	t/ha
If soil test P is high (> 60 ppm), apply manure at P rate (Q) ^[6]		11	t/ha

¹ See Appendix C for imperial units and a blank template worksheet.

² 1 tonne = 1000 kg

³ A positive value indicates that more P₂O₅ will be applied than the crop will remove (1x crop removal) when manure is applied based on N. A negative value indicates that less P₂O₅ will be applied than the crop will remove (1x crop removal) and the rate should be compared to the soil test recommendation to determine if the crop requirement for P will be met.

⁴ When soil test phosphorus (STP) is low to moderate, manure can be applied based on N. When STP is high, a P-based application rate can be used up to 2X the crop removal of P₂O₅. At very high to excessive STP, no more than 1X crop removal of P₂O₅ should be applied.

⁵ Positive value indicates N application rate is above soil test recommendation when manure is applied based on P₂O₅. Negative value indicates N application rate is below soil test recommendation and supplemental commercial fertilizer is required to meet crop requirements.

⁶ If annual applications are too low, multi-year application rates and rotation of fields should be considered.