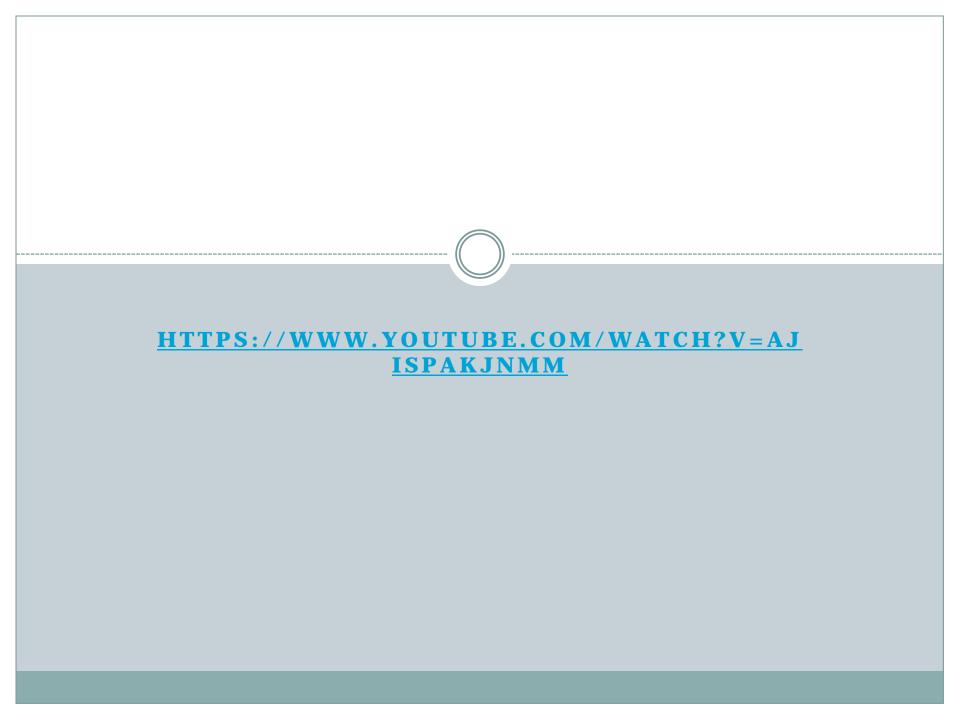
Application Equipment Calibration

ALEC LIPSCOMB

NUTRIENT MANAGEMENT SPECIALIST

VERONA REGIONAL OFFICE



Calibration

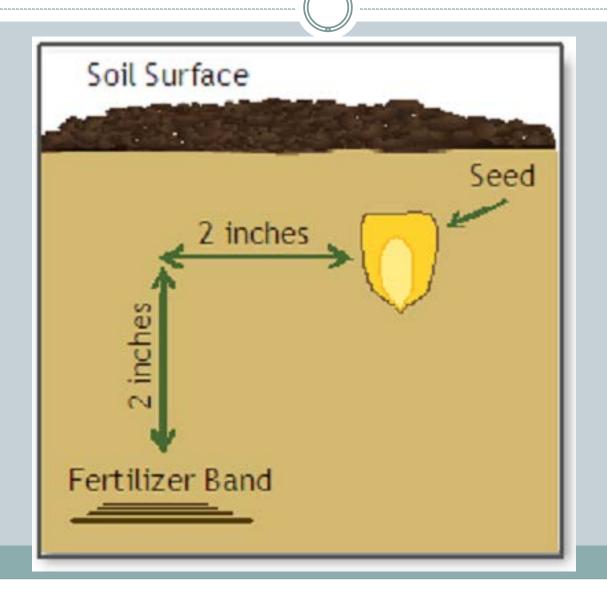
Very Important Component of Implementing a Nutrient Management Plan

- Right Recommendation +
 - Right Application rate =
 - **Economical production**
 - **Good Yields**
 - **Satisfied Client**
 - Wrong application rate =
 - Wasted resources manure, money
 - **▼** Poor Crop Yields
 - Dissatisfied Client

Fertilizer and Manure Application Terms

- **Broadcast**-material applied evenly to a field, on the soil surface, crop usually NOT established
- Topdress- material applied evenly to a field, crop is present
- **Sidedress** (fertilizer applications) material is applied in narrow bands between rows of growing crop. Material is usually surface applied, but may be incorporated or injected.
- **Banded** (starter fertilizer applications) material is precisely placed in a narrow band near seed or plant.
- 2X2 band placement-band of fertilizer is located 2" to the side and 2" below the seed.

2X2-Banded Fertilizer Placement



• 1 Acre = 43,560 sqft.

208.71'

208.71

• 1 Acre = 43,560 sqft

968'

45

Dry Spreaders –

Truck



Pull type-ground drive



Sprayers

Commercial Sprayers



Farmer Sprayers



Manure Spreaders







Remember this!!!!!

The basis of ALL calibration determination is:

HOW MUCH

Is applied to

What area

RATE LB/Ft² Tons/Acre

Kg/Ha

Gal/Acre



Example – Calibration of Litter spreader

Weigh the truck empty, then weigh it loaded. The farmer spread two passes. Then weigh the truck again.

Width of spread is 75 ft. Length of spread is 1480 ft. Weight of off loaded poultry litter is 10,340 lbs.

Area spread is 75' x 1480'. This equals 111,000 Ft²

Amount/Area

 $10.340 \# / 111,000 \text{ft}^2 = .0931531 \# / \text{ft}^2$

 $10,340 \# / 111,000 \text{ ft}^2 = .0931531 \# / \text{ft}^2$

Now convert this per square foot rate to a per acre rate.

.09315 #ft² x 43,560 ft² = 4057.6 # per acre

Convert pound per acre to tons per acre.

 $4057.6 # \div 2000 #/ton = 2.03 tons / acre$

Calibration –Dry Applicator

Exercise 1:

You have pulled a dry fertilizer spreader, with a 45 ft spread pattern through a 184 ft course and collected 57 pounds of material. What is the application rate in pounds per acre?

Calibration –General Rule

- 1. Determine area covered during calibration
- 2. How much material was applied

Formula:

Pounds of material ÷ Area (sqft) = Pounds/sqft

Pounds/sqft X 43,560 = Pounds/ac Pounds/sqft X 1,000 = Pounds/1,000 sqft



Calibration – Dry Fertilizer Spreader Exercise -1

Formula:

Pounds of material \div Area (sqft) = Pounds/sqft 57 lbs \div 8280 sqft = .00688 lbs/sqft

Pounds/sqft X 43,560 = Pounds/ac.00688 lbs/ sqft X $43,560 = \frac{299.86 lbs}{ac}$

Pounds/sqft X 1,000 = Pounds/1,000 sqft .00688/sqft X 1,000 sqft = **6.88 lbs/sqft**

Calibration – Non Ground Drive

- 1. Pounds of material collected
 - a. Determine time needed to cover application course
 - **b.** Calculate area of course
 - c. Amount of material collected in the time interval
- 2. Calculate amount of material applied per sqft (in lbs or gallons)
- 3. Multiply by 43, 560 sqft to get rate

Calibration Exercise – Pull type sprayer Exercise 2

- 40 ft. Boom (24 nozzles X 20" spacing)
- 5 mph application speed
- 50 psi application pressure
- Tip Size 8003 TP
- 8003 TP @ 50 psi delivers 44 ounces/minute



Calibration Exercise 2 – Pull type sprayer

1. Distance to cover one acre:

 $43,560 \text{ sqft } \div 40 \text{ ft boom} = 1089 \text{ feet for 1 acre}$

2. Time to cover 1 acre:

 $1089 \text{ ft} \div 7.33 \text{ ft/sec} = 148.56 \text{ seconds}$

(1.47 ft/sec = 1 mph;

1.47 ft/sec X 5 mph = 7.33 ft/sec

Calibration Exercise – Pull type sprayer

- In 149 seconds you collect 109 ounces of water/nozzle –
 (2.48 minutes X 44 ozs/minute = 109 ozs
- 4. 109 oz/nozzle X 24 nozzles = 2,616 ounces $2,616 \text{ oz} \div 128 \text{ oz/gallon} = 20.44 \text{ gallons/acre}$

Calibration – Nozzle Table



Teelet VisiFlo Flat Spray Tips

Features:

- Tapered orige flat spray pattern for uniform ownerage in broadcast spraying.
- Visific color-coded version available in stainless steel, ceranic and polymer in 80° or 110° spray angles in selected sizes.
- Available in ceramic 80° capacities 01–01 and 1° 0° capacities 01–02.
 See SR and SRC Teejer* Ups on pages 10 and 11 for larger capacities.
- Actilable in brass in 110° spaw angle only with Visifile color-coding.
- Standard version (not do or-model) available in 15°, 25°, 40°, 50° and 6° spray angles in press, stainless steel or hardened stainless steel.
- See page 33 for Techs even flat spray tips.
- Automatic spray alignment with 25612-FNFR Quick Teeter cap and gasket. Reference page 57 for more information.
- Automatic spray alignment for sizes 10 thru 20 with 25610.—NYR Quick Terjes cap and gaskes, Reference page 57 for more information.

	(3g(D)	(S)	047 H022.1	TANASTP ONL TOCHE TO TO June												
-	Carried A				1 200	5 0 94	6 W-H		DA.		l 1s Med		CARD	OMS PER	0.000	SQ. FT.
	TPG500G3† TPB000G37 TP1108056* (100)	85 40 50 50	0.043 0.047 0.060 0.056 0.056	55 60 94 72 78	35766	28 28 29 33	2.5 2.5 2.5 2.6 1.0	1.5 1.7 1.9 2.1 2.1	1.5 1.4 1.5 1.7 1.6	11 12 12 14	0.05 0.05 0.39	0.54 0.74 0.83 0.01	0.15 0.16 0.17 0.19 0.41	011 011 013 014	0.02 0.08 0.08 0.10 0.10	0.05 0.05 0.05 0.05
	TP650067 ? TP800067 ? TP1100067 ? (100)	10 15 40 50	0.058 0.051 0.067 0.075 0.052	74 81 86 96	50 56 61	370	7.1 7.1 4.3 7.7 4.1	23 25 25 25	1.9 4.0 2.2 2.4	1.6 1.7 1.9 2.0	100000	0.94 0.94 0.99 1.1 1.2	0.21 0.23 0.26 0.28	0.14 0.14 0.15 0.17 0.12	0.10 0.11 0.11 0.13 0.14	0.05 0.05 0.05 0.15 0.15
	TP6501** TP8001 TP11001 (100) TP650157	15 40 10 10 10	6,687 6,694 6,10 6,11 6,12 6,18 6,11	12 12 13 14 15 17	65 70 62 62 89 97	5.6 5.5 6.5 7.7 8.3	4.7 4.7 5.0 5.4 5.0 6.4	255445	2.6 2.8 1.0 3.3 1.6 1.5	2236723	1.7 2.0 2.2 2.7 2.7 2.7 2.7	1.4 1.4 1.6 1.6 1.8	0.10 0.22 0.14 0.37 0.41 0.44 0.46	021 021 021 023 027 027	0.15 0.16 0.17 0.19 0.20 0.22 0.74	0.13 0.13 0.13 0.15 0.16 0.16
,	TP110015 (100)	40 50 60	C.15 C.18	19 12 23	11.1 12.6 13.4	8.9 10.1 10.7	7.4 9.4 8.9	5.5 5.3 6.7	4.5 5.5 5.5	45	3.0 3.4 3.6	2.2 2.3 2.7	0.51 0.58 0.51	0.34	0.26 0.25 0.31	0.25 0.21 0.24
	TP6502 TP9002 TP11002 (50)	40 15 40 10 50	G.17 G.19 G.25 G.24	24 26 28 31	12.6 16.1 16.9 16.1 17.8	10.1 11.3 11.9 13.1 14.8	9.4 9.8 10.5 11.9	7.1 7.4 8.2 6.9	5.6 5.5 6.5 7.7	446	3.8 4.4 4.4 4.8	2.5 2.8 3.3 3.5	0.56 0.65 0.66 0.75 0.84	0.43 0.43 0.53 0.53	0.23 0.32 0.34 0.37 0.41	0.25 0.25 0.35 0.35
	TP6503 TP11003 (50)	40 40 10 60	0.45 0.45 0.45 0.14 0.47	16 48 41 47	19.3 21 42 25 27	16.6 16.6 17.8 20	12.5 13.9 14.5 16.8 18.3	10.4 11.1 12.6 14.2	7.7 6.8 9.6 10.1	5.4 5.5 8.4 9.7	5.5 5.5 6.7 7.3	3.8 4.2 4.5 5.0 5.0	0.85 1.0 1.2 1.3	0.63 0.63 0.63 0.77 0.84	0.48 0.51 0.53 0.53	0.35 0.45 0.45 0.55
	TP6504* TP8004 TP11004 (90)	10 25 40 50	0.37 0.45 0.45 0.45	45 47 51 58 53	26 27 30 83 36	21 22 34 27 25	12.3 18.3 19.8 22 24	18.0 13.2 14.9 46.2 18.2	11.0	9.2 9.6 11.1 12.1	6.9 7.9 8.9 9.7	57 68 77 77	1.2 1.3 1.4 1.2 1.2	0.74 0.84 0.91 1.0	0.63 0.63 0.77 0.77	0.51 0.51 0.61 0.62
	TP9005 TP91005 TP11005 (50)	50 40 50 50	CAR CAR 0.30 0.55 0.61	55 80 64 72 78	92 35 37 42 45	26 25 33 35	21 25 28 30	16.0 12.4 18.6 21 23	14.5	10.6 11.6 12.6 15.1	85 93 99 111 121	9.4 7.6 7.4 8.3 9.1	1.2 1.6 1.7 1.2 2.1	0.97 1.1 1.1 1.3 1.4	0.73 0.89 0.85 0.95	0.58 0.68 0.78 0.83
	TP8506 TP8006 TP:1005 (S0)	55 40 50 50	C.13 C.36 C.00 C.67 C.76	87 72 77 86 93	36 42 45 30 54	31 38 49 45	26 28 36 33	19.7 21 72 25 25	15.4 16.6 17.5 19.5	15.6 16.6 16.1	10.3 11.1 11.9 13.3 14.5	83 83 89 99	1.0 2.0 2.3 2.5	1.3	0.83 0.95 1.0 1.1 1.2	0.71 0.76 0.02 0.091 0.91
	TP6508- TP8006 IP11008 (50)	20 25 40 50	C.89 C.26 C.80 C.85 C.85	56 102 114 125	31 36 36 33	41 45 46 53	34 37 48 48 48	26 25 30 33 33	20 22 24 26 29	17.1 16.6 19.8 24 34	13.7 14.9 15.8 17.6 19.4	16.2 11.4 11.9 13.2 14.6	2.3 2.6 2.7 3.0 3.3	1.6 1.7 1.8 2.0 2.2	1000	0.94 1.0 1.1 1.2 1.3
	TP6510* TP3010* TP11016* (24)	35 48 50 50	0,87 0,94 1,00 1,12 1,22	111 120 128 143 156	25 70 74 83 91	97 36 50 67 74	07588	32 32 42 43	20 40 33 11	27 28 25 25 28 10	17.2 18.6 19.8 22 24	12.9 14.0 14.9 16.6 18.1	1.0 3.2 1.4 3.8 4.1	20 21 23 25 28	1.6 1.7 1.9 2.1	12 13 14 15
	TP6515* TP8015 TP11015*	10 15 40 50 10	1,45 1,45 1,55 1,66 1,66	166 179 192 215 216	104 111 125	77 85 100 100	64 60 74 83 61	48 53 53 62 65	39 45 50 51	32 35 37 44 45	26 28 50 33 76	19.3 20 22 27	4.4 428 50 5.7 5.3	232	2222	18 19 20 23 25
•	TP6520 TP8020 TP110267	50 35 40 50 70	1.78 1.87 2.00 2.24 2.45	221 219 256 287 314	28 19 49 66 72	103 111 115 135 145	86 91 99 111 121	64 69 74 81 91	51 53 53 67 73	48 45 30 35 61	34 17 29 49	26 20 30 34 36	5.9 6.4 6.8 7.6 8.3	39 42 45 51 56	29 34 38 42	245 27 23 33

Note: Always double check your application rates. See pages 152-157 for useful formulas and information. "Available in all bress, stainless steel with hundered stainless steel only.











Optimum Spray Height

	\$ _ av _
65"	35"
80*	30"
110	20"

Reference technical section page 153 for more information

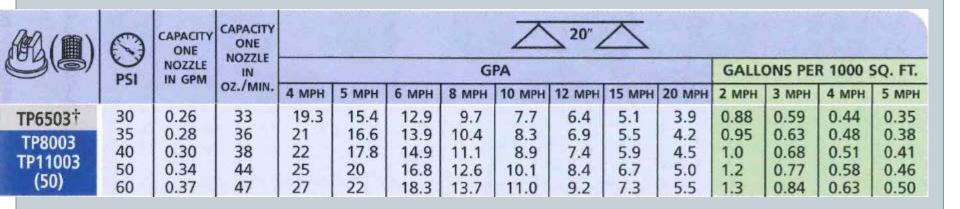
How to order:

Specify Concenter:
Deamples:
TP8002VS Stain ess Steel with
Vis.Ho color-cooling
TP11002VP Playmer with VisiFlo
color-coding
TP11001VK Cearnic with VisiFlo
polymer color-coding
TP11002-HSS Hardened
Stain ess Steel

TP8002-SS - Stainless Steel TP8002 - Brans

IP11004VB — Bress with Visible color-metric (110° only)

TeeJet Nozzle Specification



Calibration – Manure Spreaders

- Tarp Method Lay a tarp(s) of known area in the field where manure is being applied, spread the area of the field, pick up the tarps with the manure and weigh.
- Load-area Method Spreading a load of known weight or volume and measuring the area covered by that load.

Manure Spreader Calibration- Tarp Method Exercise - 3

- 14 pounds of poultry litter is spread on a
 10 ft X 10 ft tarp.
- The dry manure spreader holds 12 tons of litter.
- Part 1 What is the rate per acre of poultry litter?
- Part 2 How many acres will one spreader load cover?

Complete Manure Spreader Calibration, Tarp Method - Exercise 3

Manure Spreader Calibration -Tarp Method Exercise 3

Part 1:

Amount applied
$$X 43,560 = Pounds/acre = Tons/ac$$

Area covered 2,000 lbs

Part 2:

Calibration Table – Tarp Method

TABLE 1.	CALIBRATIO	N OF	MANURE	SPREADERS

	Size of Plastic Sheet						
Pounds of Manure	8' x 8'	10' x 10'	12' x 12'				
Applied to Sheet	Tons of Manure Applied/Acre						
Applied to Sheet	Tons of Manufe Applied/Acre						
1	0.34	0.22	0.18				
2	0.68	0.44	0.36				
3	1.02	0.65	0.54				
4	1.36	0.87	0.73				
5	1.70	1.09	0.91				
6	2.04	1.31	1.09				
7	2.38	1.52	1.27				
8	2.72	1.74	1.45				
9	3.06	1.96	1.63				
10	3.40	2.18	1.82				
11	3.74	2.40	2.00				
12	4.08	2.61	2.18				
13	4.42	2.83	2.36				
14	4.76	3.05	2.54				
15	5.10	3.27	2.72				
16	5.45	3.48	2.90				
17	5.79	3.70	3.09				
18	6.13	3.92	3.27				
19	6.47	4.14	3.45				
20	6.81	4.36	3.63				
21	7.15	4.57	3.81				
22	7.49	4.79	3.99				

Calibration - Load-area Method

- Liquid Manure spreader holds 3,000 gallons
- Spread pattern 10 ft wide
- Spreader travels 2,100 ft to apply one load
 What rate of manure was applied per acre?

Amount Applied (gallons) X 43,560 sqft = gals/ac. Travel Dist. (ft) X Spread Width (ft)



Spreader Calibration – Load-area Method Exercise 4

Amount Applied (gallons) X 43,560 sqft = gals/ac. Travel Dist. (ft) X Spread Width (ft)

3,000 gals X 43,560 = 6,223 gals/ac 21,000 sqft (2,100 x 10)

Questions?