

Field Calibration Procedures for Semi-Solid Animal Waste Application Equipment

LOAD-AREA METHOD SPREADER SYSTEM



North Carolina Cooperative
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North Carolina State University

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LOAD-AREA METHOD

SPREADER SYSTEM

Information presented in manufacturer's charts are based on average operating conditions for relatively new equipment. Discharge rates and application rates change over time as equipment gets older and components wear. For pump and haul application equipment, application rates and patterns may vary depending on forward travel and/or PTO speed, gear box settings, gate openings, operating pressures, spread widths, and overlaps.

Equipment should be calibrated on a regular basis to ensure proper application rates and uniformity. Calibration is a simple procedure involving collecting and measuring the material being applied at several locations in the application area. Calibration helps ensure that nutrients from animal waste are applied efficiently and at proper rates.

Pump and Haul Application Systems

Liquid applicators and tank spreaders are an alternative to irrigation systems for transporting and applying liquid lagoon effluent, liquid manure slurries, and lagoon sludges. Proper location and design of pumping and loading pads are necessary to protect equipment and operators and avoid damaging the lagoon dike or embankment. Care should be taken to minimize spills during loading and transport.

Semi-solid (slurry) applicators can be calibrated by one of two methods: **load-area method**, and **weight-area method** (see AG-553-4). Liquid applicators are best calibrated by the load-area method.

Load-Area Method

To use the load-area method, you must know the spreader capacity. Spreader capacity is normally rated by the manufacturer and often is indicated on the application equipment. Liquid spreaders are normally rated in gallons while semi-solid spreaders are rated in either bushels or cubic feet.

As the name implies, the load-area method involves applying a full load to a measured area. For ease of measurement, it is best to use a rectangular field pattern. For PTO-driven spreaders, application

rate is dependent on ground speed so a uniform speed must be maintained throughout the swath length. Ground-driven applicators apply reasonably uniform rates independent of ground speed.

Load-Area Method Calibration Procedure

1. Spread at least one full load of manure in a rectangular field pattern.
2. Measure the length and width of coverage. Do not include the outer fringe areas of the coverage which receive much lighter applications than the overlapped areas.
3. Multiply the length (feet) by the width (feet) and divide by 43,560 to determine the coverage area in acres.
4. Divide the weight or volume of load of manure in the spreader by the acres covered to determine the application rate in tons or gallons per acre.
5. If the application rate (Item 4) is not acceptable, repeat the procedure at different spreader settings, speeds, or both until the desired application rate (tons or gallons per acre) is achieved.

CALIBRATING LIQUID MANURE SPREADERS USING THE LOAD-AREA METHOD

1. Determine the capacity of the manure spreader.

a. _____gallons

2. Spread at least one full load using the regular spreading patterns of the applicator.

	Trial 1	Trial 2	Trial 3
b. Forward speed, gear, or throttle setting	_____	_____	_____
c. PTO speed or setting	_____	_____	_____
d. Spreader gate setting	_____	_____	_____
3. Measure the area of spread.			
e. Spread area width	_____	_____	_____ ft
f. Spread area length	_____	_____	_____ ft
g. Spread area (e X f)	_____	_____	_____ ft ²
h. Spread area (g ÷ 43,560)	_____	_____	_____ acre

4. Compute the manure application rate.

i. Number of loads spread	_____	_____	_____
j. Capacity per load (a)	_____	_____	_____ gallons
k. Total manure spread (i X j)	_____	_____	_____ gallons
l. Application rate (k ÷ h)	_____	_____	_____ gal/acre

5. Compute the nutrient application rate.

m. Manure analysis	N	_____	_____	_____ lbs/1000 gallons
	P ₂ O ₅	_____	_____	_____ lbs/1000 gallons
	K ₂ O	_____	_____	_____ lbs/1000 gallons
n. Application rate	N	_____	_____	_____ lbs/acre
(l X manure analysis number ÷ 1000)	P ₂ O ₅	_____	_____	_____ lbs/acre
	K ₂ O	_____	_____	_____ lbs/acre

6. If the application rate is not acceptable, repeat the procedure at different spreader settings, speeds (Item 2), or both, until the desired application rate is achieved.

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