Formulas for Type A and Type B Animal Waste Management System Operator Certification Examinations

$$\text{Precipitation rate (in./hr)} = \frac{96.3 \times \text{sprinkler flow rate (gpm)}}{\text{sprinkler spacing (ft)} \times \text{lateral spacing (ft)}}$$

$$\text{Time of operation (hr)} = \frac{\text{application volume (in.)}}{\text{precipitation rate (in./hr)}}$$

$$\text{Application volume (in.)} = \frac{19.3 \times \text{sprinkler flow rate (gpm)}}{\text{lane spacing (ft)} \times \text{travel speed (in./min)}}$$

$$\text{Travel speed (in./min)} = \frac{19.3 \times \text{sprinkler flow rate (gpm)}}{\text{lane spacing (ft)} \times \text{application volume (in.)}}$$

$$\text{Area of rectangle (ft}^2\text{)} = \text{length (ft) x width (ft)}$$

$$\text{Area of circle (ft}^2\text{)} = 3.14 \text{ x (circle radius)}^2$$

$$\text{Coverage area (area of rectangle in ft}^2\text{)} = \text{length (ft)} \times \text{width (ft)}$$

$$\text{Application rate for spreader (gal or tons/acre)} = \frac{\text{spreader load volume (gal or tons)}}{\text{coverage area (acres)}}$$

$$\text{Spreader load (tons)} = \frac{\text{weight of 5 gal manure} \times 1.5 \times \text{spreader capacity (ft}^3\text{)}}{2{,}000}$$

$$\text{Application rate (tons/acre)} = \frac{\text{lb manure collected} \times 21.78}{\text{sheet length (ft)} \times \text{sheet width (ft)}}$$

$$\text{Application rate (tons/acre)} = \frac{\text{spreader load (tons)} \times 495}{\text{time (min)} \times \text{width (ft)} \times \text{travel speed (mph)}}$$

$$\text{Travel speed (mph)} = \frac{\text{spreader load (tons)} \times 495}{\text{time (min)} \times \text{width (ft)} \times \text{application rate (tons/acre)}}$$

Conversion Factors

1 acre-inch = 27,154 gallons

1 acre = 43,560 square feet

lane spacing for traveling gun = 70% to 80% of wetted diameter

lane spacing for stationary gun = 50% to 65% of wetted diameter