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

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

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

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

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

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

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

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

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

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

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

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

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