

USDA  
NRCS

CENTER PIVOT SPRINKLER DESIGN

KS-ENG-22  
Rev. 11/01

Irrigator/Owner: \_\_\_\_\_ County: \_\_\_\_\_  
Legal Description: \_\_\_\_\_ Plan No. \_\_\_\_\_

Note: Design data is from National Engineering Handbook Part 652, Irrigation Guide (IG), KS652.0605(c) and KS652.0408.  
percent chance rainfall used for this design.

Soil: \_\_\_\_\_  
Intake Family: \_\_\_\_\_  
Design Group: \_\_\_\_\_

Crop: \_\_\_\_\_  
Residue: \_\_\_\_\_ lbs/ac  
Land Slope: \_\_\_\_\_ %

Design Flowrate (Q) (system - end gun flowrate): \_\_\_\_\_ gpm  
Center Pivot Wetted Radius (R): \_\_\_\_\_ ft  
Center Pivot Angle of Rotation (a): \_\_\_\_\_ degrees  
Distance from Pivot to Outer Drive Wheel (r): \_\_\_\_\_ ft  
Wetted Diameter of Largest Lateral Nozzle (w): \_\_\_\_\_ ft

System Efficiency (E) (IG Table KS6-1): \_\_\_\_\_ %  
Desired Net Application (d): \_\_\_\_\_ in  
Daily Irrigation Duration: \_\_\_\_\_ hrs/day

Gross Application (D)  $D = d/E$ : \_\_\_\_\_ in  
Area Irrigated by Center Pivot Wetted Radius (A) (IG Table KS6-17): \_\_\_\_\_ ac  
Time to Irrigate Entire Area Once (T)  $T = (18.75 * D * A) / Q$ : \_\_\_\_\_ days  
 $T = (18.75 \times \text{_____} \times \text{_____}) / \text{_____} = \text{_____} \text{ days}$   
(value entered automatically in the Excel spreadsheet)

Design gpm/acre =  $Q/A$ : \_\_\_\_\_ gpm/ac  
Minimum Gross Irrigation Requirement for Sprinkler: \_\_\_\_\_ gpm/ac  
IG Tables KS4-10, KS4-10a, KS4-11, KS4-11a, KS4-12, or KS4-12a  
Maximum Allowable Application Rate (IG Table KS6-10): \_\_\_\_\_ in/hr  
(value entered automatically in the Excel spreadsheet)

Minimum Wetted Diameter of Largest Nozzle: \_\_\_\_\_ ft  
Outer Drive Wheel Travel Speed: \_\_\_\_\_ ft/min  
Design Application Rate =  $(192.6 * r * Q) / (R^2 * w)$ : \_\_\_\_\_ in/hr  
 $\text{Rate} = (192.6 \times \text{_____} \times \text{_____}) / (\text{_____}^2 \times \text{_____}) = \text{_____} \text{ in./hr.}$

NOTE: If "Design gpm/acre" < "Minimum Gross Irrigation Requirement for Sprinkler," then this is an INADEQUATE IRRIGATION DESIGN and one must reduce acres, change crop, or increase water supply.

NOTE: If "Design Application Rate" > "Maximum Allowable Application Rate," then this is an INADEQUATE IRRIGATION DESIGN and one needs to decrease flow rate (Q) or desired net application (d) or increase wetted diameter (w).

Planned by: \_\_\_\_\_ Date: \_\_\_\_\_

Checked by: \_\_\_\_\_ Date: \_\_\_\_\_