

PART 585 - IRRIGATION SYSTEM, TRICKLE-441

§KS585.00 Design Criteria

Design in accordance with the criteria listed in the Kansas Standard and Specifications for Irrigation System, Trickle-441 and the procedure outlined in the trickle irrigation section of the Kansas Irrigation Guide.

§KS585.01 Surveys

(a) Record notes on loose-leaf field notebook sheets (Forms SCS-ENG-28 and SCS-ENG-29), or field note sheets (Forms KS-ENG-37 and KS-ENG-37a). Run a ground surface profile survey along the proposed centerline of the main line, the manifold or sub-main, and the entire length of the lateral lines. If it can be determined, run the profile on the lateral line which will represent the maximum operating condition for the system. Usually this will be the longest lateral and also the furthest from the water source. If not, run the profile midway between the tree rows that the lateral lines will serve. Take and record ground elevation shots at 100-foot intervals and at all significant high or low points ( $\pm 2.0$  foot) that occur between the regular stations.

(b) On relatively uniform systems with less than 10.0 feet (3.0 meter) of overall elevation difference, take selective elevation shots in lieu of a standard profile survey at:

- (1) Water source
- (2) Beginning and end of the manifold or sub-main
- (3) At all significant breaks in elevation (as defined in §KS580.01) along the lateral line(s) including the end point(s). Standard engineering notes should be prepared to document this type of survey.

(c) Set at least one permanent benchmark, preferably at or near the well or water source. Set reference or working hubs as needed.

§KS585.02 Design and Plans

(a) If the trickle irrigation system will serve a windbreak or wildlife planting, complete Form KS-ECS-5, Windbreak and Wildlife Planting Plan and Record.

(b) Develop the trickle irrigation system design in accordance with the criteria listed in §KS585.00.

(c) Use Form KS-ENG-428(JS) and with the guide plan for this form as a reference, fill out as follows:

- (1) Plot the profile of the main line, manifold, and lateral lines.

PART 585 - IRRIGATION SYSTEM, TRICKLE - 441

(2) Develop the design using the hydraulic design data section of the form. The hydraulic design data table need not be filled out if printer output or photocopy from an approved programmable calculator or computer program is attached. Proper notation shall be made on the plan if this method is used.

(i) Refer to the section on trickle irrigation in the Kansas Irrigation Guide for the procedure to be used in filling out this data block.

(ii) A notation should be made as to which design criteria was used for determining pipe friction loss for the system.

(3) Draw in the hydraulic grade line on the profile view to determine working pressure conditions at all points along the system.

(4) Draw in the plan view of the system as shown on the guide sheet.

(5) List the recommended operating conditions for the system.

(6) List materials to be used in the Table of Quantities.

(7) Complete the title block. List the landowner, legal description, persons doing the design, drawing, tracing, and checking of the plan. The person responsible for approving the plan should sign and date in the appropriate block.

§KS585.03 Layout

Ordinarily sufficient stations, alignment, and grade stakes will be set when the design survey is made. If additional reference stakes are needed, standard engineering notes should be prepared to document this work.

§KS585.04 Checkout

(a) Sufficient checking of the completed system should be done to make certain it was installed as shown on the plans. This would include the correct location and size of all lines and fixtures, especially the spacing and type of emitters installed.

(b) The person doing the checkout should write the following statement on the plan after determining the system does meet all requirements, "System conforms to all design and material requirements as shown on the plan." They should then sign and show the date below this statement.

PART 585 - IRRIGATION SYSTEM, TRICKLE - 441

8KS585.05 Sample of Form KS-ENG-428 for trickle irrigation systems.

USDA-SCS

Guide plan for completing KS-ENG-428 (JS)

PROFILE ALONG MAIN LINE AND ROW 1  
SCALE: 1" = 100' Horiz. 20" Vert.

| REACH  | PIPE SIZE (IN.) | Q (G.P.H.) | REACH LENGTH (FT.) | FRICTION LOSS (FT/100') | REDUCT. FACTOR | LOSS (FT.) | ELEV. OF H.G.L. |
|--------|-----------------|------------|--------------------|-------------------------|----------------|------------|-----------------|
| Source | -               | 285        | -                  | -                       | -              | -          | 118.5           |
| A      | 3/4             | 285        | 100                | 5.87                    | 1.0            | 5.9        | 112.6           |
| B      | 3/4             | 235        | 75                 | 4.19                    | 1.0            | 4.2        | 111.6           |
| C      | 3/4             | 185        | 25                 | 2.76                    | 1.0            | 0.7        | 110.9           |
| D      | 3/4             | 135        | 25                 | 1.59                    | 1.0            | 0.4        | 110.3           |
| E      | 3/4             | 85         | 75                 | 0.71                    | 1.0            | 0.2        | 110.3           |
| F      | 1/2             | 85         | 525                | 3.25                    | 0.36           | 6.1        | 104.2           |

TABLE OF QUANTITIES

| ITEM                                 | UNIT     | QUAN. |
|--------------------------------------|----------|-------|
| Tubing, 3/4" dia. main & manifold    | Lin. Ft. | 205   |
| Tubing, 1/2" dia. laterals           | Lin. Ft. | 2,650 |
| Emitters-1 gph-pressure compensating | Ea.      | 285   |
| Filter-100 mesh                      | Ea.      | 1     |
| Pressure regulator-30 psi            | Ea.      | 1     |
| Pressure gauge-100 psi               | Ea.      | 2     |
| Flushing plug-manual-3/4" dia.       | Ea.      | 1     |
| Flushing plug-manual-1/2" dia.       | Ea.      | 3     |
| Non-freeze hydrant-3/4" dia.         | Ea.      | 1     |
| Line valves-1/2" dia.                | Ea.      | 5     |
| Couplings, tees & fittings as needed |          |       |

**TRICKLE IRRIGATION SYSTEM**

OWNER: EXAMPLE      SEC: T      R: R

LEGAL DESC.:

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

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

Drawn by: \_\_\_\_\_ Date: \_\_\_\_\_

Sheet No. 1 of 1

**INSTALLATION NOTES:**

- Bury main and manifold (min. 30")
- Install lateral lines on ground surface, allow 5% extra for temperature expansion and contraction.
- Install line valves at start of each lateral line.
- Add 5' of tubing to the end of each lateral line and the manifold for temporary sediment storage.
- See attached KS-ENG-428 for windbreak details.
- SCS criteria used for design.

**DETAIL AT WATER SOURCE (Not to scale)**

Injection equipment (Optional)

Pressure regulator (As needed)

Pressure gauges

Buried or surface main, manifold & lateral

Filter

Ground line

DETAIL AT WATER SOURCE (Not to scale)

- Operate system so that pressure gauge below filter and regulator indicates 25 psi to 35 psi.
- Apply approx. 2 gal./plant/week, 1st yr.; 4 gal./week, 2nd yr.; 5 gal.-3rd yr. (Apply 5 gal. every two weeks after 3 years)
- Flush line periodically (minimum twice per season)
- Clean or flush filters weekly or as needed.
- Remove filters and other fixtures before freezing weather. Follow manufacturer's instructions on need to drain system.

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KS585-4

PART 585 - IRRIGATION SYSTEM, TRICKLE-441

585.06 Sample of Form KS-ECS-5  
 USDA WINDBREAK AND WILDLIFE KS-ECS-5  
 SCS PLANTING PLAN AND RECORD 5/84

Owner Example Address \_\_\_\_\_  
 Operator \_\_\_\_\_ Phone Number \_\_\_\_\_  
 Sec. \_\_\_\_\_ Twp. \_\_\_\_\_ Rge. \_\_\_\_\_ County \_\_\_\_\_ Field Number 5  
 GPCP Number \_\_\_\_\_ ACP Number \_\_\_\_\_  
 Watershed \_\_\_\_\_ Site Number \_\_\_\_\_ Page 1 Of 1

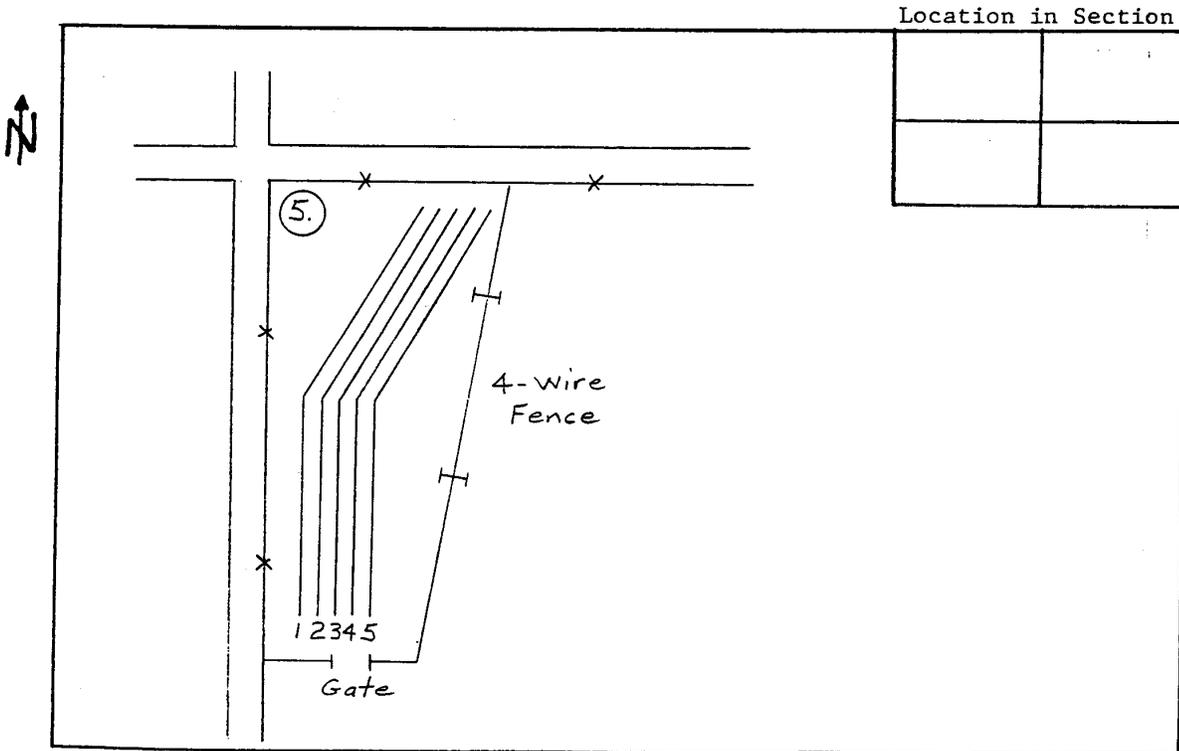
| TYPES OF PLANTING            | (Check)                             |
|------------------------------|-------------------------------------|
| Farmstead Windbreak          |                                     |
| Field or Livestock Windbreak | <input checked="" type="checkbox"/> |
| Erosion Control              |                                     |
| Odd Area                     |                                     |
| Field Border or Living Fence |                                     |
| Other                        |                                     |

| PRESENT GROUND COVER    | (Check)                             |
|-------------------------|-------------------------------------|
| Grass                   |                                     |
| Stubble and Stalks      |                                     |
| Supplemental or Replant |                                     |
| Weeds                   |                                     |
| Other                   |                                     |
| None                    | <input checked="" type="checkbox"/> |

| METHOD OF PLANTING |          |                                     |             |
|--------------------|----------|-------------------------------------|-------------|
|                    | District | Farmer                              | Date        |
| Machine            |          | <input checked="" type="checkbox"/> | <u>1989</u> |
| Hand               |          |                                     |             |

PLANNED WEED CONTROL  
 Between Rows Tillage  
 In the Rows Tillage & Chemical

SKETCH OF PLANTING



(over)





