

**NATURAL RESOURCES CONSERVATION SERVICE**  
**DOCUMENTATION REQUIREMENTS FOR**  
**IRRIGATION PIPELINE**

**CODE 430**

**Design Criteria**

Design in accordance with the criteria listed in [Conservation Practice Standard 430, Irrigation Pipeline](#); [National Engineering Handbook \(NEH\) Part 652, Irrigation Guide, Section KS652.0710\(c\)](#); and [NEH Part 636, Structural Engineering, Chapter 52](#). The pipeline should be installed at the location and serve the area as shown on the irrigation development plan or plan map for the irrigation system.

**Surveys**

Run a ground surface profile survey along the centerline of the proposed pipeline using standard engineering notes. Record notes on [Form NRCS-ENG-28 and Form NRCS-ENG-29, Loose Leaf Field Sheet](#), or [Forms KS-ENG-37 and KS-ENG-37a, Field Notes](#), or in the survey instrument's data collector. (See the "[Example of Form KS-ENG-37](#)" section.) Take and record ground elevation shots at 100-foot intervals and at all significant breaks in grade that occur between the regular stations. The shots can be extended to 200-foot intervals if the ground is uniformly sloped or level. When tying on to extend existing pipelines, take ground elevation shots along these lines at all critical locations and at the water delivery point of the underground pipe system if this information is not known. Also, determine pipe diameter, type, pressure, and pressure rating of the existing pipeline(s).

Set at least 1 permanent bench mark (tie back to the bench mark used on the irrigation development plan, if available). Set reference hubs or temporary bench marks as needed.

Locate and identify special conditions such as buried utility lines, roads, etc., which may affect the design and installation of the pipeline. Safety procedures listed in [National Engineering Manual \(NEM\) Part 503](#) and [NEM Part KS503](#) should be strictly followed.

**Layout**

Generally, sufficient stations, alignment, and grade stakes will be set when the design survey is made to establish the location of the pipeline. In some cases, it will be necessary to set special reference stakes along the line after design and prior to pipe installation. These should be described in the survey notes.

**Design and Plans**

Develop the design in accordance with the "Design Criteria" section. Design documentation may be in the form of a worksheet and plotted profiles. The final documentation for the pipeline design should show the following:

- Water requirements for the planned use, proposed capacity of the system, and required pumping time per day and month to meet needs—Complete [Form KS-ENG-394, Irrigation Water Management - 449, Planned Crop and Water Requirement](#), or equivalent.
- A ground surface profile along the centerline outlined in the "Surveys" section.
- The design of the system at the maximum operating condition—Show the hydraulic grade line when the pipeline is operating at this condition. Plot extra grade lines as needed for lateral lines or special conditions. Calculate and list the maximum head or pressure in the pipeline. Also check and list the standing head or static head in any connecting pipelines that are subjected to pressure under the maximum operating condition. The hydraulic grade lines do not have to be plotted when the maximum operating conditions are shown adequately in the calculations. [Form KS-ENG-23, Irrigation Pipeline - 430](#), that is in the Irrigation Pipeline Spreadsheet can be used for pipeline design and documentation. (See the "[Example of Form KS-ENG-23](#)" section.)

Record the following design information on [Form KS-ENG-23](#):

- Enter the name of the owner and/or operator and location information.
- Identify and show location of all fixture locations such as pump stands or doglegs, water source, air-vacuum relief valves, pressure relief valves, riser valves and gate valves, and other appurtenances. Show location and description of the pipe and appurtenances on the front side and details of the kind and amounts of materials in the "Table of Quantities" on page 2. Use additional sheets as needed to show all details.
- Show the plan view of the proposed pipeline with stations and important fixture locations on the location map and attach a map as needed for larger systems.
- Indicate any special instructions needed for installation of the pipeline.

- Sign the "Designed by," "Checked by," and "Approved by" blocks and enter the respective dates.
- Complete the "Layout by" block and enter the date.

#### **Checkout**

Record the following information on [Form KS-ENG-23](#):

- Linear feet of pipe installed for each pipe size.
- Depth of cover over pipeline.
- Installed location, size, and pressure rating of all appurtenances.
- Any observed markings from the pipe and appurtenances.
- Sign the "Checkout by," and "Audited by" blocks and enter the respective dates.





Example of Form KS-ENG-23 (Page 1)

USDA NRCS	<b>Irrigation Pipeline - 430</b>	KS-ENG-23 Rev. 3/11							
Name	<u>W. R. Irrigator</u>	Ident. No. <u>Tract 106</u>							
Legal Desc.	<u>SW 1/4 5-5-5</u>	County <u>Finney</u>							
Before any investigation or construction activity, the excavator is responsible for calling Kansas One-Call at 800-344-7233 (800-DIG-SAFE) or 811.									
	Design	Installed							
Station	Diameter (inches)	Material Type	PIP or IPS	SDR or Sch. No.	Rating (psi)	Length (feet)	Depth (inches)	Length (feet)	Depth (inches)
0 to 18+30	8	PVC	PIP		50	1830	36	1825	36

Plastic Irrigation Pipe (PIP), Iron Pipe Size (IPS), Standard Dimension Ratio (SDR), Schedule (Sch.) No.

Appurtenances	Design			Installed		
	Station	Size (inches)	Rating (psi)	Station	Size (inches)	Rating (psi)
ARV	0 + 00	3	50	0 + 00	3	50
PRV set @ 50 psi	0 + 00	4	50	0 + 00	4	50
Pump stand	0 + 00	20	50	0 + 00	20	50
Check valve, Flow meter	0+00, 0+00	8, 8	50, 50	0+00, 0+00	8, 8	50, 50
Riser & valve	18 + 30	8	50	18 + 00	8	50
Thrust blocks	0+00,18+30		50	0+00,18+25		50

Location Map      Scale 1" = 1320'

Remarks:

<u>T. M. Tech</u>	<u>11/4/03</u>
Designed by	Date
<u>J. W. Check</u>	<u>11/6/03</u>
Checked by	Date
<u>J. M. Tech</u>	<u>11/6/03</u>
Approved by	Date
<u>T. M. Tech</u>	<u>11/4/03</u>
Layout by	Date
<u>J. M. Tech</u>	<u>12/2/03</u>
Checkout by	Date
<u>J. W. Check</u>	<u>12/2/03</u>
Audited by	Date

USDA  
NRCS

**Irrigation Pipeline - 430** NRCS, KS  
January 2013

Name W. R. Irrigator

Ident. No. Tract 106

Legal Desc. SW 1/4 5-5-5

County Finney

**Example of Form KS-ENG-23 (Page 2)**

Name W. R. Irrigator

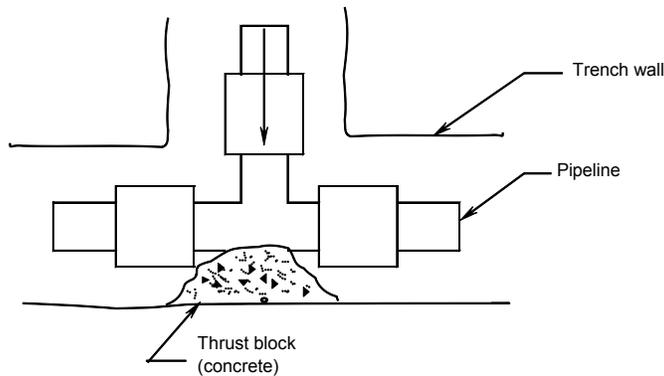
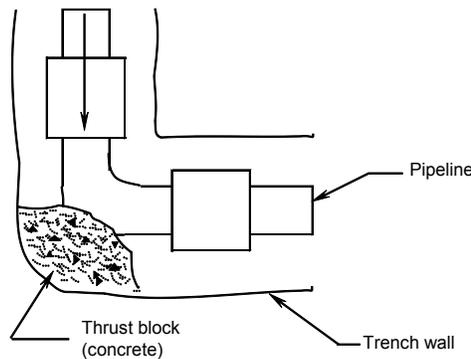
Legal Desc. SW 1/4 5-5-5

KS-ENG-23

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Table of Quantities

Item	Unit	Design Quantity	Installed Quantity
Pipe, 8" dia., PVC, 1120, 50 psi, PIP	Lin. Ft.	1830	1825
Pressure relief valve, 4", AA96 C or equivalent, w/ fixtures	Each	1	1
Air-vacuum relief valve, 3", AV-150 or equivalent, w/fixtures	Each	1	1
Pumpstand - existing 20" 1/	Each	1	1
Check valve - existing at the well 1/	Each	1	1
Flow meter - existing at the well 1/	Each	1	1
Riser & valve - at the center pivot	Each	1	1
Thrust blocks	Each	2	2
1/ 50 psi pressure rating is listed (as min.), but the actual rating is higher.			



Typical Thrust Block Installations