

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

IRRIGATION WATER CONVEYANCE

RIGID GATED PIPELINE

(feet)
CODE 430HH

DEFINITION

A rigid pipeline, with closely spaced gated, installed as part of a surface irrigation system.

Scope

This standard applies to the design and installation of rigid gated pipe. It includes material specifications for aluminum and polyvinyl chloride (PVC) plastic gated pipe.

PURPOSES

To efficiently convey and distribute water to the land surface for better water management, without causing excessive erosion, water losses, or reduction in water quality.

CONDITIONS WHERE PRACTICE APPLIES

The rigid gated pipeline shall be planned and located to serve as an integral part of an irrigation distribution system that has been designed to help conserve soil and water resources on a farm. This practice shall not be used in lieu of buried pipelines for conveyance systems; however, reaches of ungated pipe may be used to obtain necessary working pressure for the system or to convey the water to various points.

Water supplies and rated of irrigation delivery for the area shall be sufficient to make irrigation practical for the crop to be grown and for border, furrow, corrugation, or contour water application methods.

CRITERIA

Working pressure

The maximum working pressure shall be 10 psi or 23 ft of head. Design working heads in excess of 23 feet shall be controlled by installing orifice plate head reducers, butterfly valves, standpipes, or other appurtenances for head control.

Friction losses

For design purposes, friction head losses shall be no less than those computed by the Hazen-Williams equation, using a roughness coefficient of $C=130$ for aluminum pipe and $C=150$ for plastic pipe, A multiple outlet factor shall be used in computing losses only when it affects the design pipe size.

Flow velocity

The design velocity in the pipeline when operating at system capacity shall not exceed 7 ft/s.

Capacity

The design capacity of the pipelines shall be sufficient to deliver an adequate irrigation stream to the design area for the planned irrigation method.

Outlet gates

Individual outlet gates shall have the capacity at design working pressure to deliver the required flow to a point at least 0.3 ft above the field surface.

Head requirement

The working head shall not be less than 0.5 ft above the outlet gates, unless a detailed design is completed to indicate that a lower head requirement is adequate. Where streamflows are erosive, a "sock" shall be installed on each gate or some other means of erosion control shall be provided.

Flushing

A surface outlet shall be installed at the terminal end of the pipeline if needed for flushing the line free of sediment or other foreign material.

Quality of water

Water quality shall be evaluated for all aluminum pipeline installations. A copper content in excess of 0.02 ppm produced nodular pitting and rapid deterioration of pipe if water is allowed to become stagnant. The pipeline should be drained after use. Provisions shall be made to prevent trash inflow into the gated pipeline.

Related structures

On farm irrigation deliver systems shall meet or have a plan for improving the system to meet the appropriate irrigation water conveyance standard.

Appurtenances used to join the gated pipeline to the delivery system outlet must have adequate capacity at design working head to deliver the required flow.

Materials

Pipe materials shall equal or exceed the physical requirements specified in the Materials section of the Practice Specification.

CONSIDERATIONS

Water Quantity

1. Effect on the components of the water budget, especially on volume and rates of infiltration, evaporation, transpiration, deep percolation and ground water recharge.
2. Effects on downstream flow or aquifers that would affect other water uses or users.
3. Potential use for irrigation water management.

Water Quality

1. Effects on erosion along furrows and the movement of sediment and soluble and sediment-attached substances carried from the field.
2. Effects on the movement of dissolved substances into the soil, and on percolation below the root zone or to ground water recharge.
3. Potential effect of water level control on soil nutrient processes such as plant nitrogen use or denitrification.

4. Effects on the salinity of soils, soil water, or downstream flows.
5. Effects of controlled water delivery on the water temperatures that could cause undesirable effects on aquatic and wildlife communities.
6. Effects on the visual quality of water resources.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

PLANS AND SPECIFICATIONS

Plans and specifications for installing gated pipelines shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purposes.

OPERATION AND MAINTENANCE

An operation and maintenance plan must be prepared by the Designer for use by the owner or other responsible for operating this practice. The plan should provide specific instructions for operating and maintaining the system to insure that it functions properly. It should also provide for periodic inspections and prompt repair or replacement of damage components.