

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**IRRIGATION FIELD DITCH**

(Ft)  
CODE 388

**DEFINITION**

A permanent irrigation ditch constructed to convey water from the source of supply to a field or fields in a farm distribution system.

**PURPOSE**

To prevent erosion or loss of water quality from the on-farm conveyance of water.

To efficiently convey water to minimize conveyance losses.

To allow better management of irrigation water.

**CONDITIONS WHERE PRACTICE APPLIES**

This standard is limited to open channels and elevated ditches of 25 cu-ft per second or less in capacity and constructed in earth materials.

Field ditches are needed as an integral part of an irrigation water distribution system design to facilitate the conservation use of soil and water resources.

Water supplies and irrigation deliveries for the area served shall be sufficient to make irrigation practical for the crops to be grown and the irrigation methods used.

There are suitable earth materials that contain enough fines to prevent excessive seepage losses and the earth materials are not subject to shrinkage cracking that will endanger the ditch. The sealing effect of sediment carried in the water may be considered in this evaluation.

**DESIGN CRITERIA**

All planned work shall comply with all Federal, State and local laws and regulations.

**Capacity requirements.** Field ditches shall have the capacity to deliver the larger of the consumptive use requirements for the crops to be grown in the field(s) or the required rate of water delivery for the irrigation method to be used.

The capacity shall be increased to provide for the additional flow required to compensate for the ditch seepage losses and to safely carry runoff from adjacent lands that must be transported to wasteways or overflow points. For capacity design, select the appropriate value of Mannings “n” considering the materials in which the ditch is to be constructed, the alignment, hydraulic radius and additional retardance because of vegetative growth.

**Velocities.** Field ditches shall be designed with a nonerosive velocity for the bare soil materials through which they pass. Local information on the velocity limit for specific soil materials shall be used when available. If such information is not available, the maximum design velocity shall not exceed those shown in Figure 6-2, Chapter 6 of Technical Release 25 “Design of Open Channels”.

**Cross Section.** Freeboard in field ditches shall be not less than one-third of the maximum design water depth. Sideslopes shall be stable, if the field ditch is to be constructed on an embankment fill the

sideslopes shall be not steeper than:

| Height to Water Surface<br>On Centerline of Fill | Steepest Allowable<br>Sideslope on Fill |
|--------------------------------------------------|-----------------------------------------|
| Less than 3 feet                                 | 1-1/2 : 1                               |
| 3 to 6 ft                                        | 2 : 1                                   |
| More than ft                                     | 2-1/2 : 1                               |

The top width of banks as measured at the elevation of the design water depth shall be not less than 12 inches or the design water flow depth whichever is greater.

**Water surface elevations.** All field ditches shall be designed so that the water surface elevations at field takeout points are high enough to provide the required flow onto the field surface. If ditch checks or other necessary water control structures are needed to provide the necessary head, the backwater effect of the structures shall be considered in computing the freeboard and capacity requirements. A minimum of 4 inches of head shall be provided.

**Related structures.** Erosion or water control structures such as checks, drops and culverts shall be designed per the requirements of Practice Standard 587, Structure for Water Control.

## CONSIDERATIONS

Consider the effects on the water budget, especially on the volumes and rates of infiltration.

Consider effects on downstream water flows and aquifers and the effect on downstream water users.

## PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared to show site specifics. The drawings and

specifications shall show ditch location, ditch cross section, required elevations and details for pertinent structures.

## OPERATION AND MAINTENANCE

The operation and maintenance plan shall include typical items as removing or controlling undesirable vegetation, rodent control, bank repair, etc.

## REFERENCES

Engineering Field Manual

Chapter 3, Hydraulics

Chapter 15, Irrigation

Technical Release 25, Design of Open Channels

NRCS Conservation Practices

Irrigation System, Surface and Subsurface, Code 443

Structure for Water Control, Code 587