Section 685.33 Gated Pipelines.

Gated pipe with multiple openings is a special design problem that can be handled by the following charts and as shown in the following example:

Example: 750 gpm will be delivered to furrows through an 8" pipe 200 feet long which has 30 outlets.

What is the friction loss and minimum head needed at the first outlet? Assume 1.0 feet of head needed at the last opening.

-- Head loss/100 ft = 1.31 ft
(from Table 685-13)

-- Head loss/200 ft. = 1.31 ft x 2 = 2.62 ft

-- Factor for calculating head loss = .360
(from Table 685-12)

-- Head loss = 2.62 ft. x .360 = 0.94 ft

-- Minimum head needed + 1.00 ft

1.94 ft

Check for excessive velocity

$$Q = \frac{750}{448.8} = 1.671\ cfs$$

Area of 8" pipe $A = \frac{\pi D^2}{4}$

$$A = \pi \frac{(\frac{8}{12})^2}{4} = 0.3491\ ft.^2$$

Velocity = $\frac{Q}{A} = \frac{1.671}{0.3491} = 4.79\ ft/\sec$

as this is 5 ft/sec or less; this is acceptable.

Section 685.34 Measurement of flow in a pipeline.

The actual measurement of flow in a pipeline on a permanent basis is done with a flow meter. Meters should be sized for the particular pipe size and flow range of the system. In order to give accurate readings, they should also be installed according to the manufacturer's recommendation.

Methods of measuring flow where no meters are installed are discussed in Irrigation Water Management – Section 686.

SECTION 685.4 REUSE SYSTEMS.

Many furrow irrigation systems can improve the water use efficiency of the system by the installation of a reuse system. The increased efficiency is the result of being able to run a larger stream down a furrow and obtain a more uniform infiltration into the root zone without as much deep percolation.

The design criteria for reuse systems are contained in Engineering Standard 447 (Irrigation System, Tailwater Recovery). The following pages give an example of field layouts with a reuse system, sizing reuse pit based on the size of the supply, and a sample design of a Tailwater Recovery System.