Appendix G

Trickle Irrigation Design Information

A systematic approach to trickle irrigation system design is outlined in this manual. The sample plans in Appendix F show the planning and layout requirements for a complete trickle irrigation system design. The following design sheet is a blank form of the design information presented in the sample plans. The designer should be conversant with trickle irrigation design principles and parameters presented in this manual before proceeding with any design.

CROP AND SOIL REPORT

Pit	Crop	Root Depth (ft)	Availability Coefficient	Soil Texture	A.W.S.C. (in/ft)	Max Lateral Water Movement radius (ft)
A	_____ B _____ _____	_____ _____ C _____	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____

DESIGN PARAMETERS

Evapotranspiration Rate (ET)	_____	in/day
Effective Soil Water Storage Capacity	_____	inches
Effective Soil Water Storage Factor (S)		
Plant Spacing	___ x ___	ft
Plant Area (A)	_____	ft^2
Crop Coefficient Factor (K)	_____	
Emitter Type	_____	
Emitter Operating Pressure	_____	psi
Emitter Discharge	_____	gph
Emission Uniformity	_____	
Application Efficiency	_____	
Water Source Capacity	_____	gpm
Pressure at Water Source	_____	psi

PLANT WATER REQUIREMENTS

$$\text{Gallons/Plant/Day} = 0.623 \times \underset{(ET)}{\underline{\hspace{2cm}}} \text{ in/day} \times \underset{S}{\underline{\hspace{2cm}}} \times \underset{A}{\underline{\hspace{2cm}}} \text{ ft}^2 \times \underset{K}{\underline{\hspace{2cm}}} \quad = \underline{\hspace{2cm}} \text{ G/P/D}$$

$$\text{Trickle System Design Requirement} \quad TC = \frac{G/P/D \times L}{E \times Eu} = \frac{\underline{\hspace{1cm}} \times \underline{\hspace{1cm}}}{\underline{\hspace{1cm}} \quad \underline{\hspace{1cm}}} \quad = \underline{\hspace{2cm}} \text{ G/P/D}$$

DESIGN DATA

Emitter Spacing	_____	ft
Emitters per Plant	_____	
Zone Flow Rate	_____	gpm
Zone Operating Time Per Day	_____	hrs/day
Total System Operating Time = _____ hrs/zone x _____ zones =	_____	hrs

FILTRATION REQUIREMENTS

Water Source

_____

Water Quality	Ca, Mg, Na, K	_____	mg/1
	Fe	_____	mg/1
	S	_____	mg/1
	pH	_____	

Screen Mesh Size or Sand Media Selection _____

ZONE FRICTION LOSS CALCULATION

Maximum Pressure Variation in Zone   _____ psi
Maximum Lateral Length   _____ ft

Average Flow per foot = emitter flow rate = _____ gph   = _____ gph/ft
  in lateral   emitter spacing   _____ ft

Lateral line friction loss =

_____ ft - _____ inch _____ pipe @ _____ gph   = _____ psi
                                                ft

Emitter Barb Loss (30% of Lateral Line Loss)   = _____ psi

Elevation Difference   _____ ft   = _____ psi

Total Lateral Pressure Loss   =   **_____ psi**

Header Line Friction Loss

Section	Flow	Pipe Length	Pipe Size	Friction Loss
_____	_____ gpm	_____ ft	_____ in	_____ psi
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Total Friction   _____ psi

Header Line Fitting Loss (additional 20%)   _____ psi

Elevation Difference   _____ ft = _____ psi

Total Header Line Pressure Loss   **_____** psi

Total Zone Pressure Loss

Header Loss _____ psi + Lateral Line Loss _____ psi   = **_____** psi

MAINLINE FRICTION LOSS CALCULATION

x – x _____ ' - _____ " _____ @ _____ gpm - _____ x _____ = _____ psi
x – x _____ ' - _____ " _____ @ _____ gpm - _____ x _____ = _____ psi
x – x _____ ' - _____ " _____ @ _____ gpm - _____ x _____ = _____ psi
x – x _____ ' - _____ " _____ @ _____ gpm - _____ x _____ = _____ psi

Total Friction Loss in Mainline   **_____**

SYSTEM PRESSURE REQUIREMENT

Pressure Required at Zone Control   _____ psi
Total Friction Loss in Mainline   _____ psi
Elevation   _____ ft = _____ psi
Miscellaneous Losses (Mainline valves, fittings, etc.)   _____ psi

                    Total Pressure Requirement   = **_____** psi **_____** ft

SYSTEM FLOW REQUIREMENT

____ gpm /zone x _____ zones operating at one time   = _____ gpm

HORSEPOWER REQUIREMENT

H.P. = _____ ft x _____ gpm   = _____ h.p.
        3960 x _____ %