29L403

DRY FIRE HYDRANT DESIGN WORKSHEET FOR PONDS OR LAKES

By: _____ Date: _____ Checked: _____ Date: _____

Town: _____, _____ County, Missouri Township _____ Range _____ Section _____

Total Drainage Area _____ minus Controlled Drainage _____ = Effective Drainage Area _____

Normal Pool Surface Area = _____ acres Normal Pool Elevation = _____

Drought of record is computed for driest 4 month period (June, July, August and September) that has occurred from 1930 to 1990.

Annual evaporation = _____ inches (Reference attached MO–2–25, Engineering Field Handbook)

Method 1 for Sites with low seepage and no other water uses.

$\frac{\text{Drainage Area}}{\text{Pool Size}}$ = _____ = _____ From Sheet 3b of 3 Drawdown = _____ feet x 1.05 = _____ feet

Method 2 for Sites with moderate seepage or other losses

Seepage rate = Seepage _____ gpm + livestock use _____ gpm = _____ gpm

Moderate Seepage = _____ gpm x $\frac{1}{7.5\ \text{gal/ft}^3}$ 60 min/hr x 24 hr/day x $\frac{1}{43{,}560\ \text{ft/ac. ft}^3}$ x 120 days = _____ acre feet

Seepage drawdown in feet = $\frac{\text{acre feet x 1.05}}{\text{Surface area at normal pool}}$ = _____ feet

Total drawdown in feet = Method 1 drawdown + Seepage drawdown = _____ + _____ = _____ feet

NOTES:

1. Equivalent methods of computing available water as approved by the local Fire Protection Districts is permissible.
2. 1 acre foot = 43,560 cubic feet 1 cubic foot = 7.5 gallons
3. Inspect site and estimate seepage rate in gallons per minute. Seepage rate for moderate seepage should vary from 3 to 10 gpm depending on site conditions. For dry toe of dam use 0 gpm seepage. For wet toe use 5 gpm. For wet toe with flowing water just visible, use 10 gpm. High seepage rates will require measuring as recommended by NRCS Engineers. Losses for livestock watering should also be considered. One (1) gpm and a large watering tank will water about 60 head of mature cattle.

Storage Computation

Surface area at low water level can be obtained from survey data or can be estimated from the following equation for a pool shape somewhere between a circle and a square.

$$W_1 = \left(\frac{\text{Normal Pool Surface Area in acres X 43,560}}{0.85}\right)^{1/2} - 10' = _____$$

$$\text{Surface Area at low water level} = \frac{0.85\ W_1^2}{43{,}560} = _____ \text{ acres}$$

Surface Area at top of intake inlet can be obtained from survey data or can be estimated from the following equation for a pool shape somewhere between a circle and a square.

$$W_2 = \left(\frac{\text{Low water level surface area X 43,560}}{0.85}\right)^{1/2} - 12' = _____$$

$$\text{Surface area at top of intake inlet} = \frac{0.85\ W_2^2}{43{,}560} = _____ \text{ acres}$$

$$\text{Available water} = \frac{(\text{Surf. Area at low water level + Surf. Area at top of intake inlet}) \text{ X Vert. Interval X 43,560 X 7.5}}{2} =$$

$$\frac{(_____ \text{ acre} + _____ \text{ acre}) \text{ X } _____ \text{ feet X 43,560 X 7.5}}{2} = _____ \text{ gallons}$$

Revised 03/08 Sheet 3a of 3

DRAFT

NOT FOR CONSTRUCTION

Date

Designed

Drawn

Checked

Approved

DRY FIRE HYDRANT DESIGN WORKSHEET

United States Department of Agriculture Natural Resources Conservation Service NRCS

File Name

Drawing Name 29–L–403

Sheet of

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