

# Agricultural Engineering

SW - 12  
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## CISTERNS - PLANNING AND DESIGN

A cistern is a tank or storage (usually underground) used for storing rain water collected from a roof or other catchment area. Cisterns are sometimes used for storing hauled water. Cisterns are usually used as a supplement to other water sources. Cisterns are very useful when the regular source of water for a farm or rural home becomes low in dry periods of the year. CISTERN WATER MUST BE CHLORINATED FOR DOMESTIC USE.

### Location

Cisterns should be located near the catchment area. Underground cisterns should be located where the surrounding area can be graded and sloped away from the cistern to prevent possible contamination from surface water.

### Catchment Area

The catchment area required depends on the amount of water needed and on the annual rainfall for the particular location. Building roofs are normally used for catchments. Once water needs have been determined (See SW-11, Farm and Home Water Requirements), and the rainfall data obtained from the weather bureau, area of catchment can be determined from the graph. Normally, cisterns need only supply 1/4 to 1/2 of annual water needs.

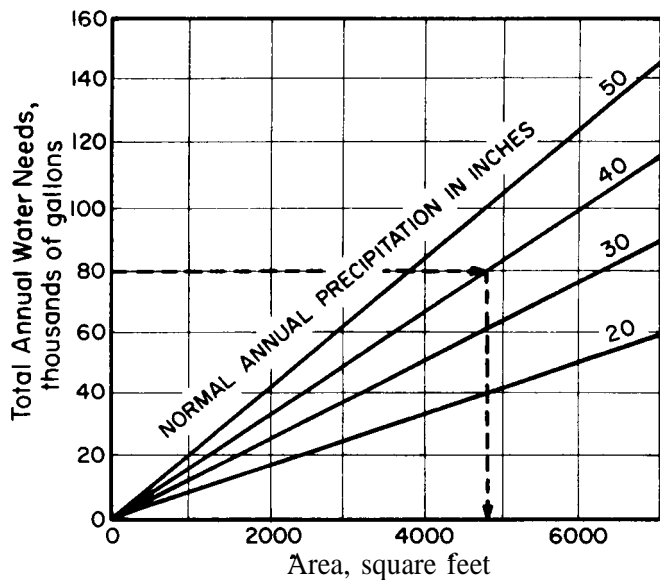


FIGURE 1. AREA OF CATCHMENT NEEDED

Example: Cistern to supply 1/4 of total need  
Catchment area—1200 sq. ft. (1/4 of 4800)

TABLE 1. QUANTITIES OF WATER PER SQ FT OF CATCHMENT AREA

Annual Rainfall (inches)	Water Available* (gallons)
10	4.2
15	6.3
20	8.3
25	10.5
30	12.5
35	14.6
40	16.7
45	18.8

\* Evaporation and other losses will use about 1/3 of annual rainfall. These values are amounts after losses.

## Roof Catchments

Water collected from a roof will vary in quality depending on type of roofing material. Galvanized steel, aluminum and shingles are the most suitable roofing materials for catchments. Factors to consider before using a roof as a catchment are:

\*Roof should be smooth—rough surfaces collect dirt and debris which affect the runoff.

\*Gutters and downspouts should be easily cleaned.

\*Painted roofs, certain wood shingles and certain asphalt shingles may impart objectionable taste or odor.

\*Roof area needs to be large enough to provide amount of water needed.

\*Atmospheric pollution in some areas may affect quality of water from a roof.

\*Consult manufacturer concerning solubility of any roof coating used.

Rain water picks up dust, soot, bird droppings and other foreign material as it passes over a roof. Special equipment is recommended to help make rain water more acceptable for use.

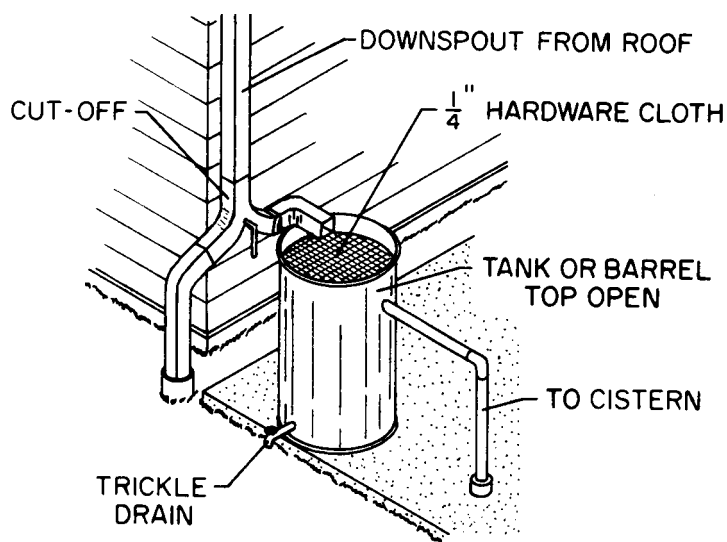
## Gutter Guards

Screens made of 1/4 to 1/2" hardware cloth and fitted over the roof gutters will keep leaves, twigs and other material out but let water flow into the gutter.

## Roof Washers

A roof washer is a "trap" to collect the first flow of dirty water from the roof when a rain starts. The washer should hold about 10 gallons for each 1,000 sq ft of catchment. The washer is located so the downspout drains into it. An outlet pipe near the top of the washer tank is connected to the cistern. A small trickle drain (1/8" hole) in the bottom of the tank permits it to empty between rains. Hardware cloth (1/4") is placed over the top of the washer tank.

Commercial type roof washers are available in various sizes. These washers contain fiberglass screens and are usually placed over the cistern inlet.



Sand, charcoal and gravel combination filters may also be used for filtering water before it enters a cistern. These filters are more expensive to construct and require more servicing. Filters usually become highly contaminated in a short time unless properly maintained. Cleaning a sand filter is more difficult than cleaning a roof washer.

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