

AN OVERFLOW SYSTEM FOR A STANDARD U. S. WEATHER BUREAU EVAPORATION PAN

Ordinarily, overflow occurs when rainfall exceeds the storage capacity of an evaporation pan (2 to 3 inches), and a day or more of important evaporation data is lost. The Weather Bureau¹ does not recommend any device to catch overflow from heavy rainfall and wind action. Rather, they prescribe the removal of water before or during a heavy rain to prevent overflow. This is not always possible at isolated stations, and some type of overflow system is useful on evaporation pans visited on other than a daily basis. Our device increases the capacity of an evaporation pan by 2 inches by means of temporary storage in bottles. The system also possesses flexibility of increased storage with a minimum of effort, and reduces the risk of overflow to a reasonable level.

The system is designed so that the overflow will fill three carboy bottles--one at a time--by gravity flow (fig. 1). Entrance of water and removal of air is facilitated by having two outlets for each bottle. A standpipe air vent in the final bottle makes it possible to fill the pan completely, even after the bottles are full.

Materials to construct the overflow system are: three 5-gallon carboy glass bottles, 5 feet of 5/16-inch aluminum tubing, 2½ feet of 3/8-inch rubber tubing, three No. 12 two-hole rubber stoppers, and a 9-inch piece of ½-inch copper tubing. Many of these items or suitable substitutes ordinarily are available, or they can be easily purchased new for about \$40.00. Approximately one man-day is needed to construct, install, and calibrate the overflow system.

Detailed instructions for construction of the overflow system are:

1. Drill a 5/8-inch hole 2 inches from the top of the evaporation pan.
2. Flange one end of the 9-inch piece of copper tubing and solder it to the pan at a downward angle.
3. Ream out the holes in the rubber stoppers with a power drill to accommodate the aluminum tubing.
4. Dig a 2½-foot-diameter hole, 15 inches deep, one foot from the edge of the pan.
5. Place bottles in hole and level.
6. Backfill with earth to secure bottles.

¹U. S. Department of Commerce, Weather Bureau. Instruction for climatological observers. Circ. B, Tenth Edition, Revised Oct. 1955.

7. Bend 7-inch lengths of the aluminum tubing in elbows (one 120° elbow, four 90° elbows) and insert in rubber stoppers with 2½ inches of the elbow protruding.
8. Connect 9-inch pieces of rubber tubing from the copper tubing to the 120° elbow and between the remaining elbows.
9. Insert the 18-inch aluminum standpipe in the third bottle with 17 inches protruding from the top of the stopper.

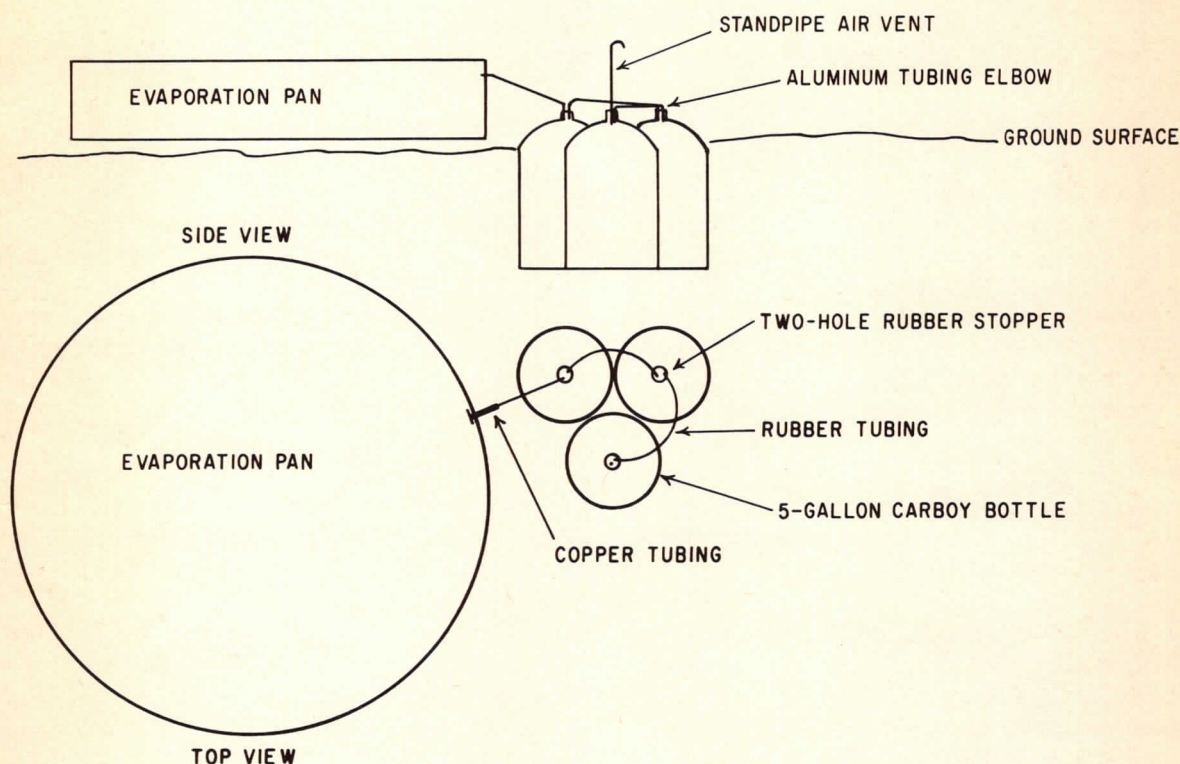


Figure 1.--An overflow system for a standard U. S. Weather Bureau evaporation pan (not to scale).

Calibration of overflow storage consists of measuring water levels in bottles and pan following transfer of a given volume of water. Calibration of overflow in the bottles to an accuracy of 0.01 inch of pan depth change can be obtained.

Operation of the system is quick and easy. Overflow can be measured through the top of the bottle with a stick gage after pulling the stopper, and the water can be removed by a hand pump without disturbing the installation.

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