COMBINING THE REQUIRED DATA INTO A BASELINE IRRIGATION PROGRAM-PHASE I

Effective irrigation programming involves the evaluation of the various environmental conditions in your area, and the physical characteristics of your irrigation system to determine how much water you must apply to your turf grass to keep it healthy. A summary of the important environmental factors includes a working knowledge of the following:

1. Average water requirements for your turf (average inches per day for each month of the year).
2. Evapotranspiration (ET) rate for your turf (average inches per day for each month of the year).
3. Site rainfall (average inches per day for each month of the year).
4. Depth of active root zone (inches).
5. Water holding capacity of soil within root zone (inches of water held per inch of soil).

The important physical characteristics of your irrigation system that you need to know in order to calculate your system programming schedule include:

1. Precipitation rates for the various irrigation zones to be irrigated (inches per hour).
2. Total number of irrigation control zones on your golf course for each precipitation rate.
3. Total irrigation time available (water days and minutes per water day).
4. Flexibility of your irrigation control system (quantity of available start times and programs).
5. System hydraulic parameters (maximum flow available from pump station, maximum number o control zones that can run at once for each main line leg or zone, etc).

Since the primary reason for irrigation is to provide the proper amount of available water to the soil that will be used by the turf, the first calculation to be done involves determining the "ET applied" (ETa). ETa represents an estimate of the amount of water to be applied by the irrigation system and is approximately equal to the soil's water storage depletion, or the evapotranspiration rate of the turf minus the effective rainfall provided to the soil by nature.

The evapotranspiration rate of turf (ETc) can be thought of as a percentage of "reference ET" after adjusting for the turf's maximum allowable stress tolerance. An excellent source for historical turf grass ETc data for the Central Coast of California is leaflet #21491 Turfgrass Evapotranspiration Map Central Coast of California published by University of California Cooperative Extension, Division of Agriculture and Natural Resources (available from ANR Publications, 510-642-2431).

Effective rainfall (ER) can be thought of as an estimate of the percentage of total rainfall that reaches the turf rootzone. For baseline scheduling purposes, monthly gross rainfall that totals less than .25 inches is considered to be 0 (zero) effective rainfall; and monthly gross rainfall levels equal to or greater than .25 inches are calculated as **.67 X monthly gross rainfall.** For example, if historical rainfall levels in March are found to be 2.32", Effective Rainfall should be estimated at 2.32" X .67 = 1.55". Monthly ER should then be converted into a daily ER figure by dividing by the number of days in the month. Therefore March daily ET in this example is estimated at .05"/day. (1.55" divided by 31 days = .05"/day).

If you continue with this example for March, and find from local historical research data that the daily ETc is .07"/day, you can easily calculate the daily ETa as follows: **Daily ETa = ETc - ER = .07" - .05" = .02"/day**

Daily ETa should be calculated for each month of the year by using this same process. Negative values for daily ETa indicate that Effective Rainfall exceeds the turf Evapotranspiration rate and irrigation should not be required during normal weather patterns.

This daily ETa data is an important step toward determining how long you need to run your sprinkler heads to provide the water required for healthy turf. The next step in the process involves combining the daily ETa with the precipitation rate of your sprinklers to determine required run times.

Next Month: Combining the Required Data into a Baseline Irrigation Program - Phase II

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