

Recommended Audit Guidelines

The Irrigation Association has developed a set of minimum guidelines to create a standardized procedure to perform an audit of a landscape irrigation system. ASABE standards have been reviewed and incorporated wherever possible. Consultation and review of the guidelines has been conducted with many irrigation auditors, contractors, statisticians, educators, irrigation consultants and the Irrigation Association Certification Board. The usage and application of these guidelines is at the discretion of others. The Irrigation Association offers the guidelines without warranty or obligation.

Irrigation Audit Guidelines

The guidelines were developed by the Irrigation Association and are intended to function as recommendations in the auditing of landscape irrigation systems. They have been designed to aid irrigation professionals in fieldwork procedures, techniques and performance calculations.

Recommendations and projections from the guidelines and their accuracy depend upon the quality of measurements and data provided by the individual user. The Irrigation Association makes no warranty, implied or expressed, as to the results obtained from these procedures.

Step #1 Pre-audit inspection

- Irrigation system should be in optimal working condition prior to performing a test.
 - Verify that the irrigation system complies with local codes.
 - Identify operational defects or deficiencies.
 - Assure that corrections have been made.

Step #2 Auditing procedures

- Maximum wind allowable during audit = 5 mph or less (ASAE S398.1). Wind speed should be monitored and recorded every five minutes during the audit test.
- Audit should reflect normal operating conditions. If normal operating conditions occur at odd hours, some assessment of the impact of these conditions should be made on the tested conditions
- Pressure tests should be conducted at normal operating conditions at the sprinkler using the appropriate pressure testing device at the beginning and end of each zone audited.
- All catch devices must be uniform in size and shape. Larger collectors give better repeatable results.
- Catchments for a test area should be documented to facilitate repeatability.
- A minimum of 24 catch devices should be used. Research (Vinchesi, et al., Irrigation Show 2007 and 2008 proceedings.) shows that smaller sprinkler spacing may require more catch devices to improve statistical accuracy.
- The catchments along the edge of the zones should be placed 12 to 24 inches in from the edge.
- Minimum catchment device spacing
 - For fixed spray sprinklers – near a head (within two to three feet) and half-way between the heads.
 - For rotor sprinkler heads spaced less than 40 feet on center – near a head (within two to three feet) and every one-third of the distance between the heads.
 - Rotor heads spaced greater than 40 feet on center – near a head (within two to three feet) and every one-fourth of the distance between the heads.
 - Unusual or irregularly shaped areas:
 - For rotor sprinklers – uniform grid of catch devices, 10 to 20 feet on center spacing (i.e., baseball infield, golf green).
 - For spray sprinklers – uniform grid of catch devices, 5 to 8 feet on center spacing (i.e., curvilinear areas without defined rows of sprinklers).
- Test run times must be consistent and appropriate for the sprinkler type and arc.
- When the test area contains multiple stations, the test run times for each station or zone must be adjusted to achieve a matched precipitation rate across the test area.

- The volume in milliliters should be approximately one and one-half times the throat area of the catch device in square inches. For example if the throat area of the catch device is 20 square inches the average volume of water should be 30 ml (20 x 1.5 = 30).
- “Linking” (using information from one station or zone and applying to another) may be used when there are a large number of sprinkler zones that are identical, i.e. the same sprinkler head, nozzle, spacing, operating pressure and irrigating similar soil and plant types. The auditor may elect to perform catch device tests on one-third to one-half of the sprinkler zones to get an average value that could be applied to all sprinkler zones that are identical.
- The following data should be documented and recorded:
 - Sprinkler head locations
 - Sprinkler head spacing
 - Sprinkler make, model and nozzle size
 - Approximate catch device locations
 - Catchment readings
 - Test run time
 - Meter readings if available
 - Pressure readings with locations
 - Wind speed readings
 - Soil types and root zone depths
 - Date and time of testing

Step #3 Performance calculations

To calculate the precipitation rate using milliliter readings:

$$PR_{net} = \frac{3.66 \times V_{avg}}{t_R \times A_{CD}}$$

- PR_{net} = station precipitation rate {in./h},
- V_{avg} = average catch volume for station {ml},
- t_R = testing run time {min},
- A_{CD} = catch device throat area {in.²}.

To calculate the low-quarter distribution uniformity:

$$DU_{LQ} = \text{Low-quarter distribution uniformity \{decimal\}}.$$

$$DU_{LQ} = \frac{\text{Average Catch of Lower Quarter}}{\text{Average Catch Overall}}$$

When calculating the base irrigation schedule it is recommended to use IA scheduling methodology and procedures as presented in the Golf Irrigation Auditor and Landscape Irrigation Auditor manuals.