

Sprinkler Irrigation Uniformity

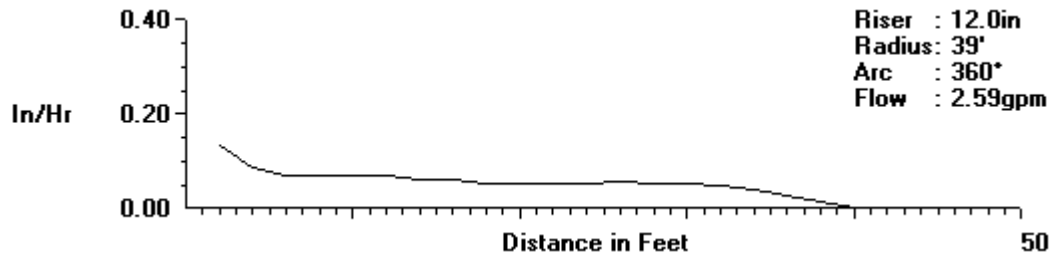
Commonly used uniformity measurements in sprinkler irrigation:

- CU – Christiansen's Coefficient of Uniformity (%) = $100(1 - \text{average deviation} / \text{average depth})$
- DU – Distribution Uniformity (%) = $100(\text{average of low } \frac{1}{4} / \text{average depth})$
- SC – Scheduling Coefficient = $\text{average depth} / \text{average of "dry window"}$

CU and DU are statistical measurements of an overlap pattern. SC is a run-time multiplier. It represents the amount one must over-irrigate to adequately irrigate the driest area (or window).

Sprinklers are tested for single leg distribution performance in a zero-wind test facility. Each test is the result of a sprinkler with specific nozzle, pressure, and riser height. The following graph illustrates the results of a single leg distribution test. The precipitation rate is plotted vs. distance.

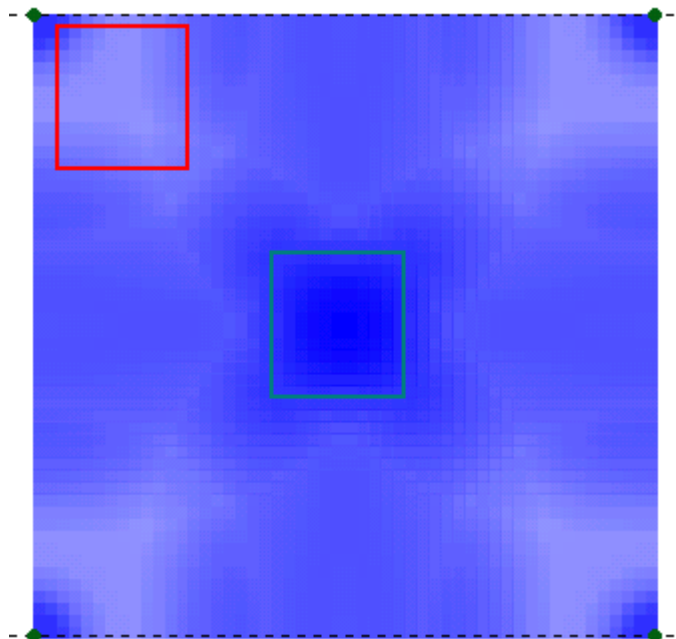
Model : 14VH
 Pressure: 45 psi
 Nozzle : RFN 2.5



Riser : 12.0in
 Radius: 39'
 Arc : 360°
 Flow : 2.59gpm

The "densogram" on the right is the result of a computer overlap analysis using the SPACE program from the Center for Irrigation Technology, Fresno, California. The test data from the above sprinkler is used in this analysis. The lateral pipe is along the top and bottom edge. The sprinkler location is marked by the green dot in each corner. Spacing may be set to either rectangular or triangular.

The darker areas are regions receiving higher precipitation. The red box denotes the "driest window" which is 5% of the total area. The green box locates the wettest region.



Spacing:
 Distance between sprinklers: 48 feet
 Distance between laterals : 48 feet
 Spacing type : Rectangular

CU = 87%, DU = 77%, SC = 1.3
 Application Rate = .108 in/hr

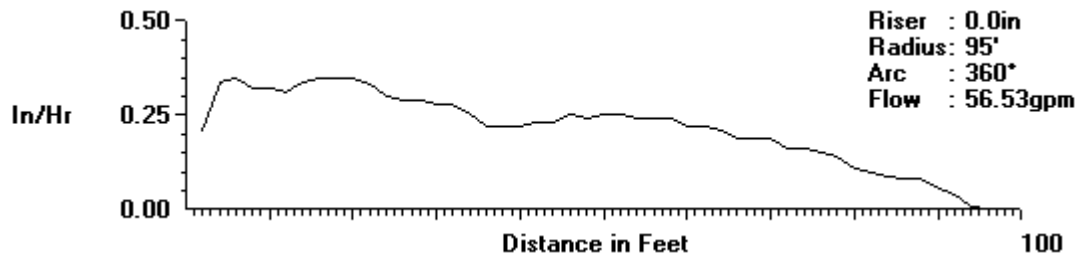
The following pages illustrate other examples of profile data, which are then analyzed at a desired spacing. Rain Bird keeps a database of the profile test data for agricultural sprinklers and Rain Guns. Printouts of this uniformity analysis may be faxed or emailed. Contact factory for details.

Applications where this uniformity analysis program is useful:

- Undertree and overcrop irrigation
- Nurseries
- Frost protection of crops
- Wastewater sprayfields
- Pastures and arenas

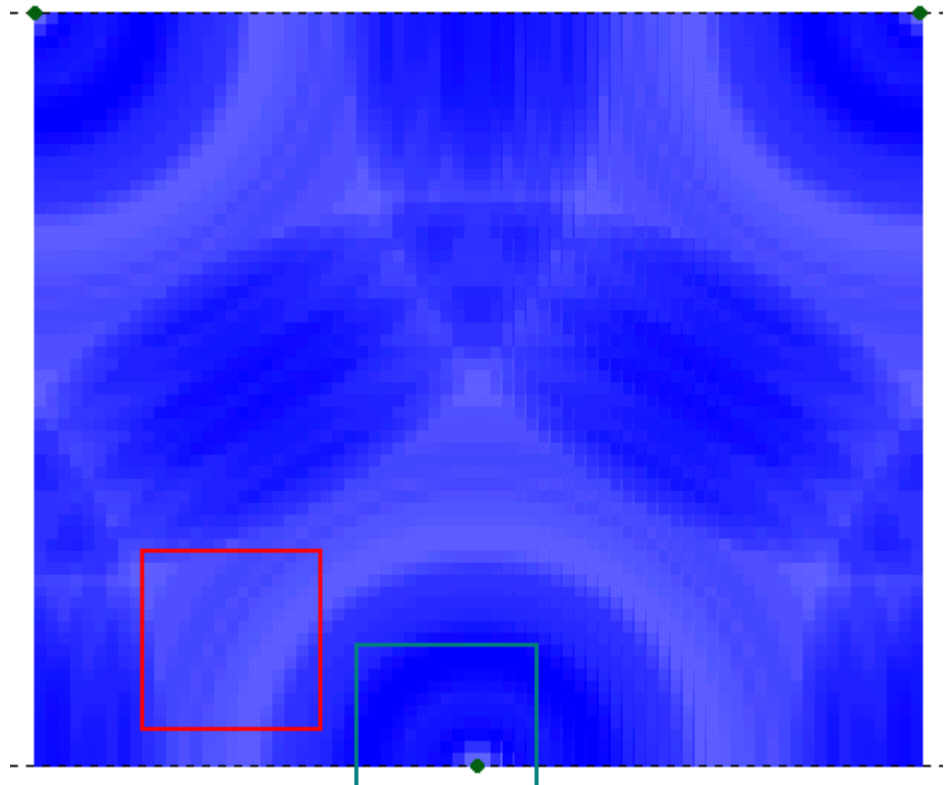
Note: This analysis is based on zero-wind test information. Use caution when field conditions are windy. If windy conditions predominate, sprinkler spacing should not be “stretched”. Use Table 9 in the Reference Tables section.

Model : 808A
Pressure: 70 psi
Nozzle : #30 by #10



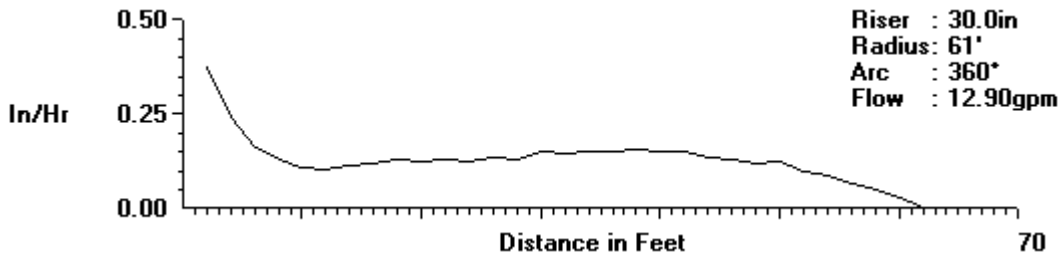
Spacing:
Distance between sprinklers: 145'
Distance between laterals : 125'
Spacing type : Triangular

CU = 89%, DU = 83%, SC = 1.1
Application Rate = .300 in/hr

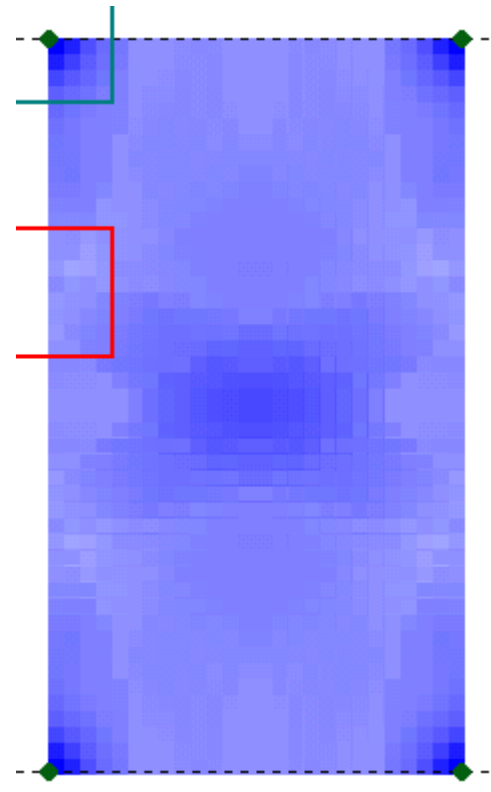


Model : 14070
 Pressure: 50 psi
 Nozzle : 1/4"

Riser : 30.0in
 Radius: 61'
 Arc : 360°
 Flow : 12.90gpm

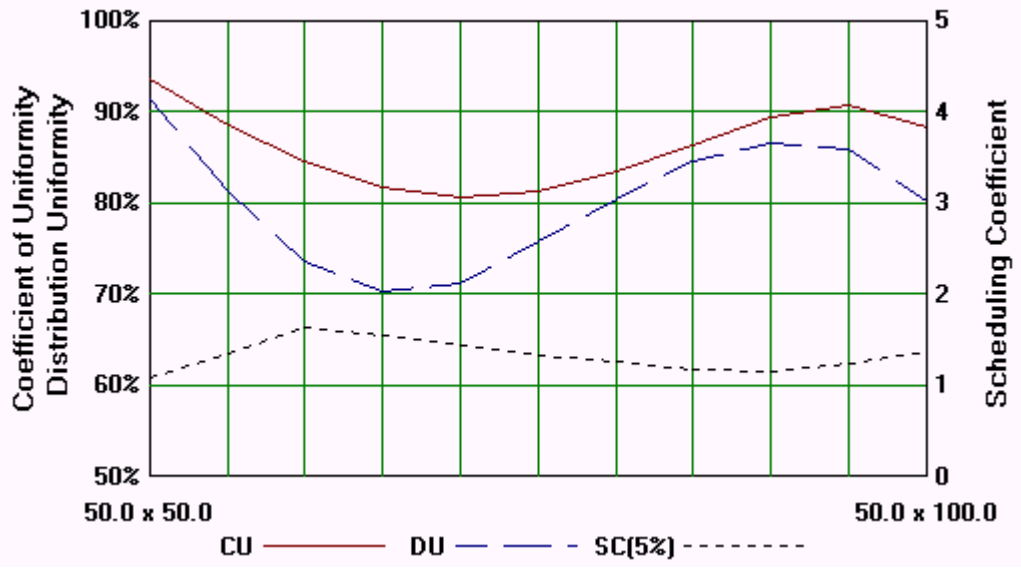


Spacing:
 Distance between sprinklers: 50 feet
 Distance between laterals : 90 feet
 Spacing type : Rectangular



CU = 89%, DU = 87%, SC = 1.2
 Application Rate = .28 in/hr

Multiple spacing analysis from 50' by 50 to 50' by 100' rectangular spacing. Notice how uniformity increases with increasing lateral spacing. This is the result of better overlapping profiles.



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