Overview on different types of irrigation systems

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Disclaimer

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Types of irrigation

• Center Pivot
  • Impacts on top
  • Sprinklers on drops
  • Lateral move

• Hard hose

• Drip systems
  • Drip Tape
  • Drip Tube
  • Micro-jets
Basics of an Irrigation System

• There are a few basics that every irrigation system needs:
  • Water source
    • Pond, creek, lake, groundwater
  • Pump and Size
    • Surface, Submersible
    • Size based on flow and head pressure
  • Filter
    • Sand media filter, screen filter, disk filter
  • Pipe to get water from pump to plant
    • PVC, layflat, oval hose, aluminum pipe, drip, ?
  • Sprinklers, emitters
  • Pressure
Center Pivot Systems

Water Resource Management Program
1. PIVOT POINT

The pivot point anchors the machine to a permanent location in the field. It also houses a system of subcomponents that contribute to the overall functionality of the pivot.

1. PIVOT LEGS

Four pivot legs are bolted or chained to a concrete pivot pad, providing support.

2. RISER PIPE

Water supply enters the pivot through this pipe.

3. PIVOT SWIVEL

An elbow-shaped fitting that connects the riser pipe to the first span.

4. CONTROL PANEL

The panel is the command center of the pivot.

5. J-PIPE

Power and control circuit wires travel through the J-pipe to the collector ring assembly.

6. COLLECTOR RING

Contact brushes rotate around stationary brass rings to provide a continuous flow of electricity to the pivot.
• [https://www.youtube.com/watch?v=6YpC1jQaDbM](https://www.youtube.com/watch?v=6YpC1jQaDbM)
Pump(s)

• The pump should be designed to get water to the sprinkler and then to the ground

• Center pivot installer will help design the pump

• Account for Total Dynamic Head or the equivalent of how high does the water have to be pumped. This accounts for elevation, length, pipe size and flow.
TOTAL DYNAMIC HEAD PROBLEM #1

 Irrigation Need
30-50 psi

X GPM Pump
Water Source/Filter(s)

• Depending on water source a filter may or may not be needed.
  • Ponds, streams, lakes --- any surface water would require a filter
RainBird Sand Media Filter

Yardney Centrifugal Sand Separators

Water Resource Management Program
Why use a filter?

- Remove items that could clog the center pivot pipes and sprinklers
- Remove sand and abrasive items that could wear nozzles
- If applying wastewater a filter is more than likely not going to be used
Sprinklers

• When purchasing a center pivot the dealer will ask what sprinkler package you would like. What is the purpose of your irrigation system can help decide on what sprinkler you would want. Are you growing peanuts, vegetable, corn, other crops.

• Do you want sprinklers on top or on drops?
Pipe

• Make sure the pipe you use meets the needs of the pressure of the water being pumped

• Water quality can affect the longevity of the pipe

• Have water tested annually
Hard Hose - Towable
Parameters of Hard Hose

- Pipe
- Filter
- Water Quality
- Sprinkler – an End Gun
Drip Systems

- Water source
  - If surface water --- a filter will be needed
  - If groundwater -- a filter would be protection

- Pump and Size
  - Based on the total dynamic head
    - Includes emitters and pressure regulator as well
Drip Systems

• Filter will be based on the emitter size and type
  • Screen usually 150 or smaller
  • Sand media with backflush
• Pipe
• Sprinklers
  • In-line tube, drip tape, micro-sprinklers
Water Resource Management Program
Pressure

• The pressure of system is based on:
  • Nozzle
  • Use (on top verses drops)
  • Higher pressure smaller drops
  • Lower pressure larger drops
  • Impacts pressure (35-60 psi)
  • Drops on center pivot (20-30 psi)
  • Drip requires low pressure (8-15 psi)
## Pressure

### Tabor Bore Nozzle

<table>
<thead>
<tr>
<th>Noz PSI</th>
<th>NOZZLE .31” 8 MM</th>
<th>NOZZLE .39” 10 MM</th>
<th>NOZZLE .47” 12 MM</th>
<th>NOZZLE .55” 14 MM</th>
<th>NOZZLE .63” 16 MM</th>
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### AQUA-TRAXX® FLOW RATES

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<th>Emitter Flow Part Number</th>
<th>Outlet Spacing</th>
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<th>Q-100</th>
<th>Emitter Exponent</th>
<th>Filtration Requirement</th>
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<td></td>
<td></td>
<td>gph</td>
<td>lph</td>
<td>gpm/100 ft</td>
<td>lph/1 meter</td>
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<td></td>
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<td>@ 0.7 bar</td>
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<td>@ 8 psi</td>
<td>@ 10 psi</td>
<td>@ 0.55 bar</td>
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Water Resource Management Program
Emitter Flow vs Pressure

Flow Rate (gph)

Pressure (psi)

0.27 gph @ 10 psi
0.20 gph @ 10 psi
0.13 gph @ 10 psi

Water Resource Management Program
Conclusion!
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Thanks and Questions?

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References of images for slides

• First slide references

• Micro-jet: https://www.ebay.co.uk/itm/Micro-Irrigation-Garden-Adjustable-Dripper-Sprinkler-on-Stake-0-40-LPH-Antelco-/281953307945

• Drip: https://www.indiamart.com/proddetail/drip-irrigation-system-2109818433.html

• Impact on top: http://www.nelsonirrigation.com/media-gallery/photographs/category/pivot

• Hard hose: http://cadmanpower.com/irrigation/travellers.html
• Slide 6 and 7
  • Drawings: Irrigation.education

• Slide 10
  • Yardney: https://www.yardneyfilters.com/centrifugal_sand_separators.aspx
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• Slide 23 and 24