**Brookdale Fruit Farm Inc**
38 Broad St Hollis NH 03049
(603) 465 2240

# Hemp Irrigation


By Zoe Stapp

Brookdale Fruit Farm Inc.

# Brookdale History

**Brookdale Fruit Farm Inc**
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- Brookdale Fruit Farm established in 1847
- Currently Operated by the 5th 6th and 7th generations of the Hardy family
- Farming hundreds of acres
  - Certified Organic 10+ Acres
- 4 major business units
  - Wholesale, Retail, Pick Your Own, Supplies


Brookdale Farm Supplies
RT 130 Hollis NH

# Brookdale Hollis, NH

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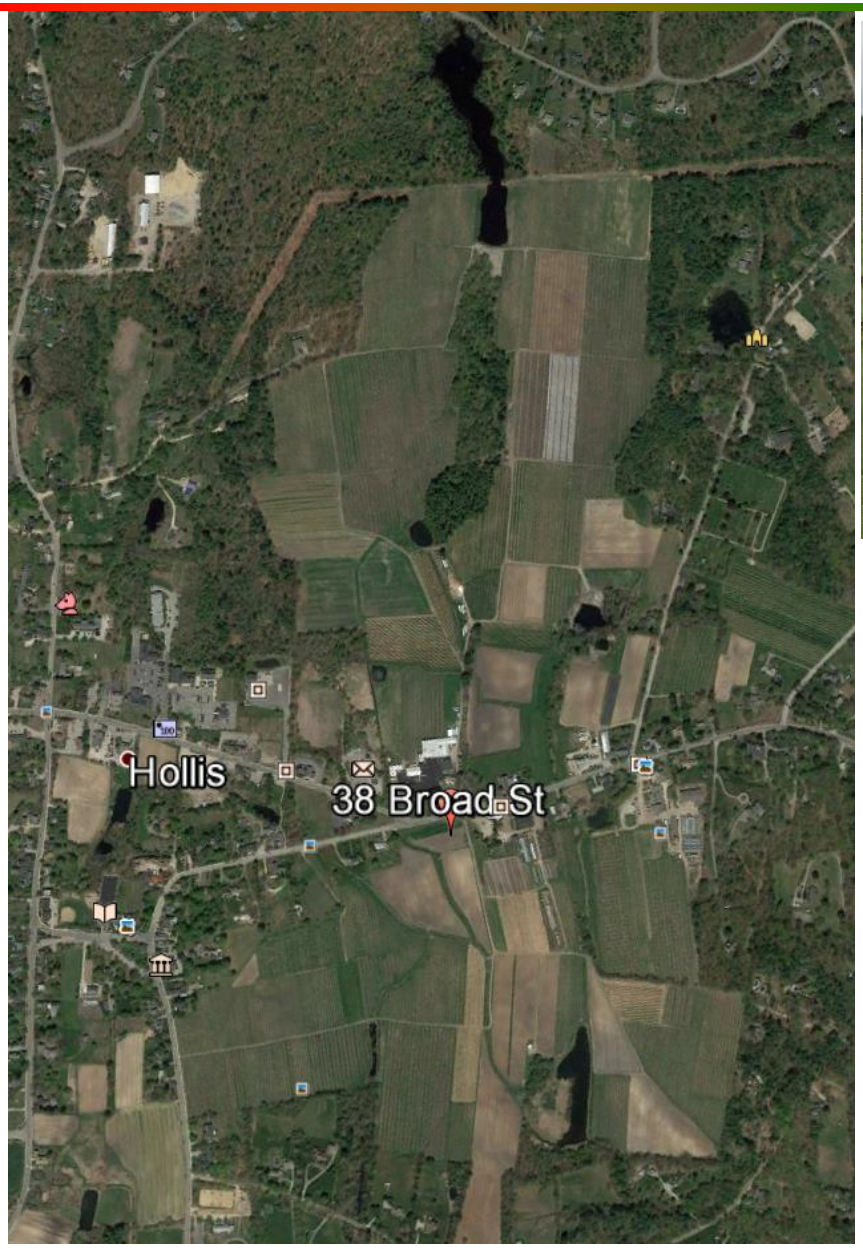



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NETAFIM™


BERRY PLASTICS

BIO 360 BIO Plus

KIFCO

JAIN Irrigation Inc

AIRCROW®

Plant Marvel

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# Overview

**Brookdale Fruit Farm Inc**
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- Water Requirements
- System Components
- Uniformity
- Install
- System Operation
- Fertigation
- Soil Moisture

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# System Design

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | **Brookdale Fruit Farm Irrigation and Row Crop Supplies** | | | **Date** | 12/27/2016 |
| | | **38 Broad St PO Box 389 Hollis NH 03049 603 465 2240** | | | | |
| | **Customer** | | | **Irrigation Sales Slip** | Prepared by | |
| | Name | | | | Trevor Hardy | |
| | Address | | | | 603 860 1657 | |
| | Contact | | | | | |
| | | **Quantity** | **Units** | **Description** | **Unit Price** | **Total** |
| 1 | | | | | | $0.00 |
| 2 | | 3400 | feet | 2 inch poly pipe 100 psi | $0.97 | $3,298.00 |
| 3 | **filter** | 1 | assembly | 2 inch single disc filter built to backflush on cam locks | $490.00 | $490.00 |
| 4 | **injector** | 1 | assembly | 2 x 3/4 fertilizer injector | $305.00 | $305.00 |
| 5 | **fittings** | **30** | feet | 2 inch red layflat hose connect filter and injector well | $1.25 | $37.50 |
| 6 | | **4** | each | 2 inch cam lock c | $7.50 | $30.00 |
| 7 | | **5** | each | 2 inch cam lock e | $4.50 | $22.50 |
| 8 | | **60** | each | 2 inch super clamps 56-59 | $5.00 | $300.00 |
| 9 | | **12** | each | dravity drain assembly | $38.00 | $456.00 |
| 10 | | **15** | each | 2 inch insert caps | $2.25 | $33.75 |
| 11 | | **20** | each | 2 inch couplers | $1.55 | $31.00 |
| 12 | | **10** | each | 2 inch eblows | $1.85 | $18.50 |
| 13 | | **5** | each | 2 inch barbed tee | $4.00 | $20.00 |
| 14 | | | | | | $0.00 |
| 15 | | **39** | coils | 24 inch o.53 spacing orchard tubing | $155.00 | $6,045.00 |
| 16 | | **200** | each | xpando starter with grommet | $1.60 | $320.00 |
| 17 | | **200** | each | figure 8 end cap | $0.20 | $40.00 |
| 18 | | **100** | each | ram coupler | $0.35 | $35.00 |
| 19 | | | | | | $0.00 |
| 20 | | 3 | asssembly | 2 way pvc valve tower with pressure gauge and air vent | $175.00 | $525.00 |
| 21 | | 1 | asssembly | 3 way pvc valve tower with pressure gauge and air vent | $225.00 | $225.00 |
| 22 | | 1 | asssembly | 2 way flow diverter with zone b threaded | $110.00 | $110.00 |
| 23 | | | | | | $0.00 |
| 24 | | | | | | $0.00 |
| 25 | | | | | | $0.00 |
| 26 | | | | | | $0.00 |
| 27 | | | | | | $0.00 |
| 28 | | | | | | $0.00 |
| 29 | | | | | | $0.00 |
| 30 | | | | | | $0.00 |
| 31 | | | | | | $0.00 |
| 32 | | | | | | $0.00 |
| 33 | | | | | | $0.00 |
| 34 | | | | | | $0.00 |
| 35 | | | | | | $0.00 |
| 36 | | | | | | $0.00 |
| | Notes: | | | | | |
| | | | | | Total | $12,342.25 |




3 way valve tower
2 way valve tower
well
main line
sub main
gravity drain

| crop | FIELD | # rows | LENGTH | ROW FT | spacing | flow | gpm |
|---|---|---|---|---|---|---|---|
| apples | A | 6 | 420 | 2520 | 2 | 0.53 | 11.1 |
| apples | B | 11 | 210 | 2310 | 2 | 0.53 | 10.2 |
| apples | C1 | 8 | 500 | 4000 | 2 | 0.53 | 17.7 |
| apples | C2 | 10 | 300 | 3000 | 2 | 0.53 | 13.3 |
| apples | D1 | 10 | 450 | 4500 | 2 | 0.53 | 19.9 |
| apples | D2 | 10 | 360 | 3600 | 2 | 0.53 | 15.9 |
| xmas | E | 42 | 100 | 4200 | 2 | 0.53 | 18.6 |
| xmas | F | 40 | 150 | 6000 | 2 | 0.53 | 26.5 |
| apples | G | 7 | 250 | 1700 | 2 | 0.53 | 7.5 |
| xmas | H | 42 | 160 | 6720 | 2 | 0.53 | 29.7 |
| | | | 186 totals | 38550 | | | |

# Why Drip

**Brookdale Fruit Farm Inc**
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- Delivers water directly to plant
  - Consistent amounts throughout field
  - Not weather dependent
- Incorporate fertilizers and chemicals into system
- 1 time set up per year
- Start it and leave it operating design
- Delivers water directly and uniformly to the plant
- Reduces evapotranspiration
- Conserves water, helps with limited sources
- Requires less pump capacity and fuel to operate
  Saves $$$$$$

# Drip Tape

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- Flat low pressure tube
- Various spaced emitters
- Various flow rates
- Install stripes/emitters up

# Drip Tape

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- Most common 5/8”
- 12” emitters
- High Flow: 0.45 Q/100
- Low Flow: 0.22 Q/100
- Filtration: 150 micron
- 12-15 PSI

Q/100=Gallons per minute per 100 feet

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# Basic Layout

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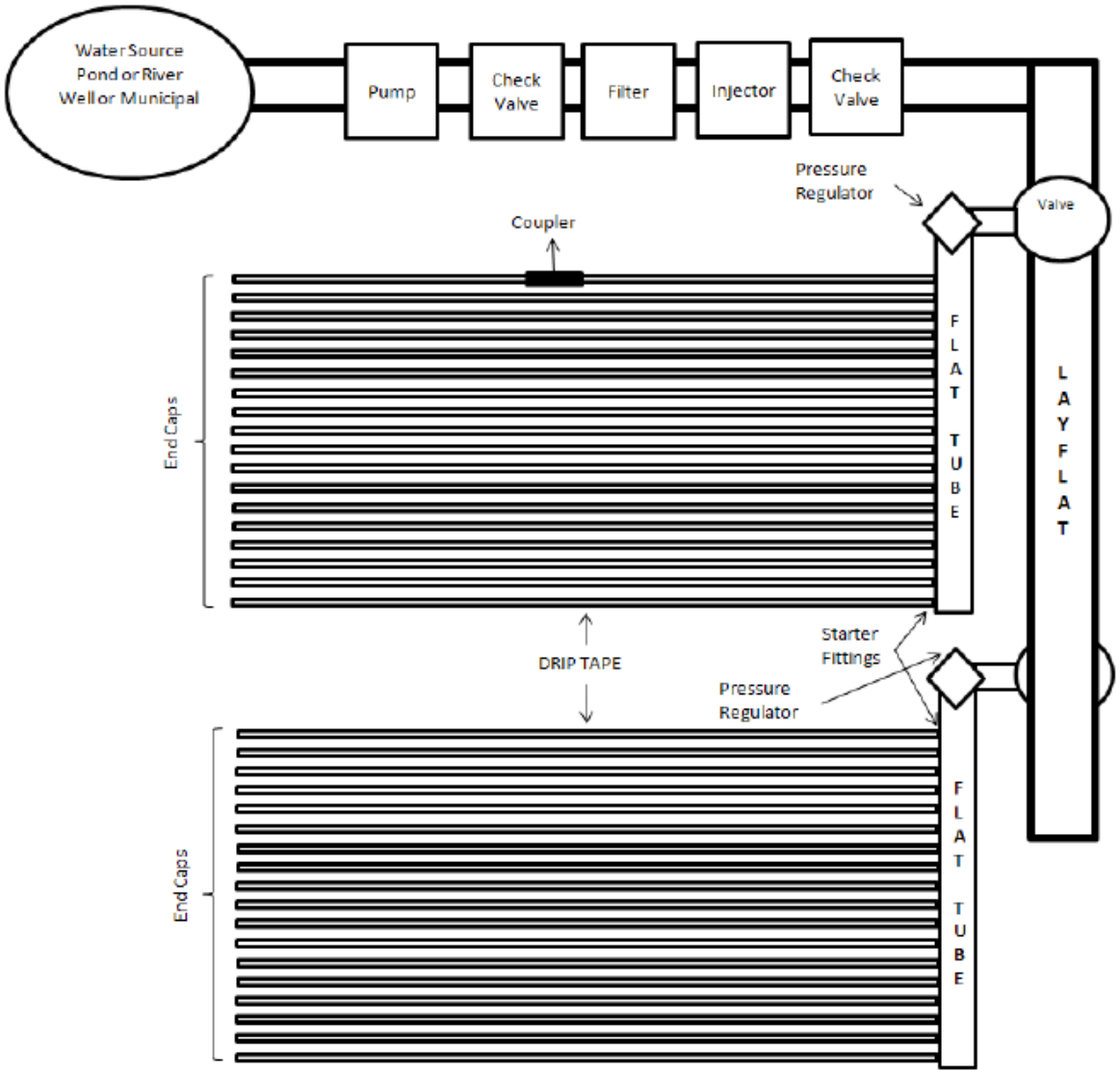

# Water Requirements

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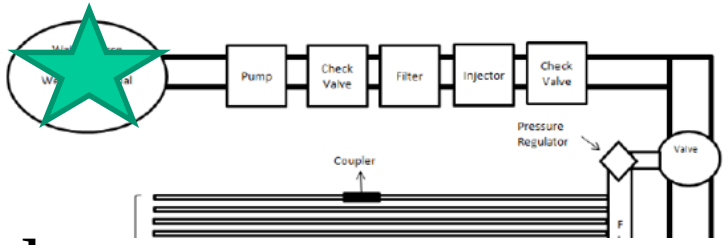


- 1 acre inch of rain per week
- 27,154 gallons per acre per week
- Approx. 545,000 gallons per acre 20 week growing cycle

| Tape | Row Ft | GPM | 4 Hour Gallons | Cycles per Week |
|---|---|---|---|---|
| 0.45 | 7210 | 32 | 7787 | 3.49 |
| 0.22 | 7210 | 16 | 3807 | 7 |

# Water Sources

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- Well/Town Water– 20 GPM/Acre
- Surface Water (most common north east)
  - River
  - Pond
- 100’ x 100’ x 8’ deep
  - 600,000 gallons

# Pumps

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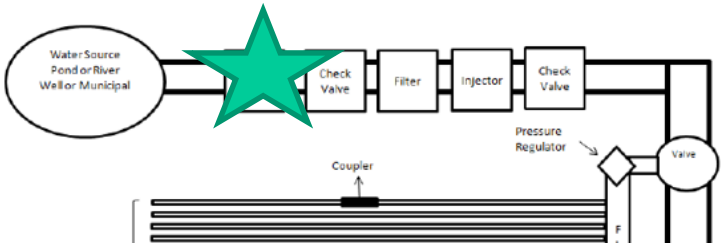


- Electric
  - Allows for easy automation
  - Requires an electrician to install
- Gas
  - High pressure pump **NOT a trash pump**
  - Easy to use
  - Set it and forget it
- Diesel
- P.T.O

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# Pump Placement

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# Filter assemblies

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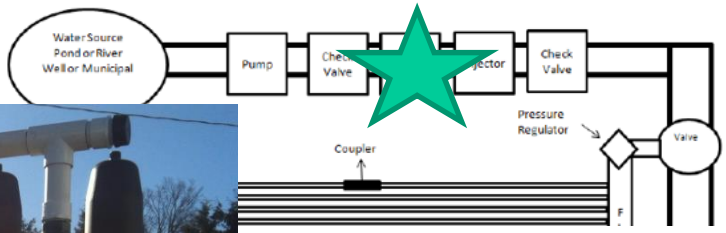


# Filters

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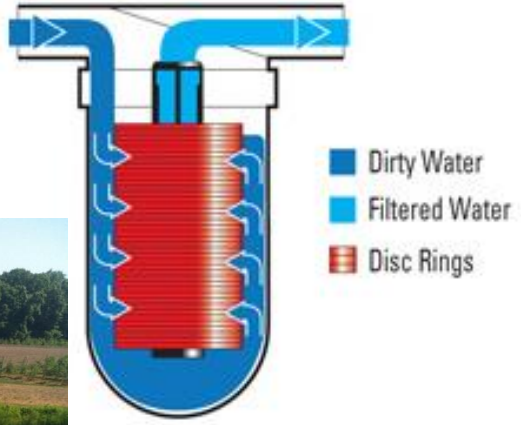
- Filter to 150 microns
- Filters run in parallel reduce pressure loss
- Increase filter capacity
- Allow for back-flushing




# Fertilizer Injectors

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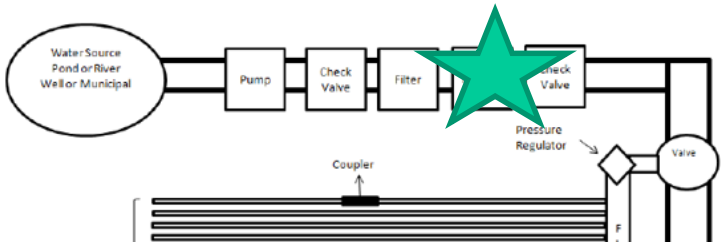


- Mazzei injector
  - Venturi action
  - Regulated by flow of water

- Mix Rite or Dosatron
  - Pump Style
  - Varying flow rates, Constant feed, precise measure


- Only use WATER SOLUBLE FERTILIZER

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# Fertilizer Injection

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| Injector Size | Flow GPM |
|---|---|
| 1/2 inch | 2 to 9 |
| 3/4 inch | 9 to 50 |
| I inch | 16 to 80 |
| I.5 inch | 34 to 150 |

Mazzei Injectors work off of FLOW RATE
NEED CORRECT FLOW TO MAKE INJECTOR WORK

Flow Rate Calculations
Drip Tape used: 508-12-45

(Total row feet / 100) x 0.45

1 acre 12” spacing drip tape on 4 foot plastic 7210 feet of tape

(7210 / 100) = 72.1 x 0.45 = **32.45** GPM

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# Lay flat Hose

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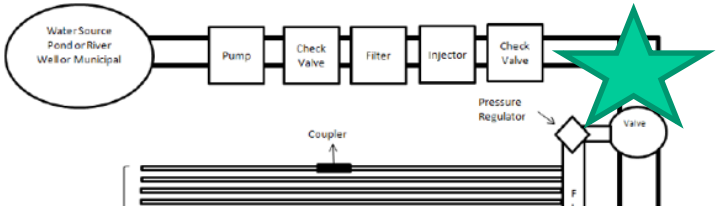


- High pressure supply line
- Can drive over
- Heavy Duty- 125 PSI
- Blue Lay flat- 80 PSI

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# Pressure Regulators

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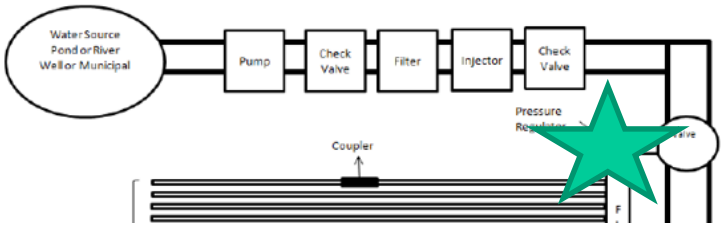
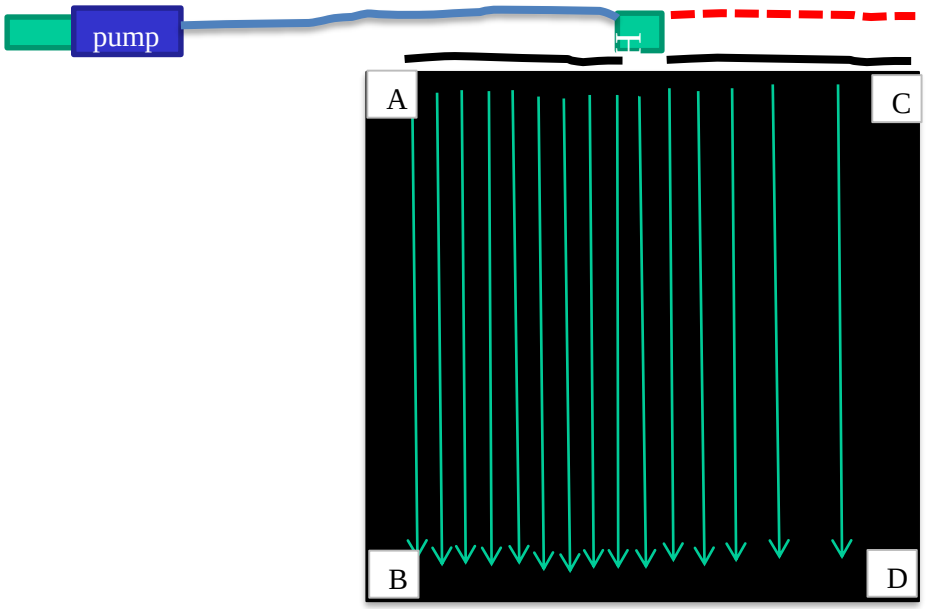
- High pressure inlet
- Low pressure outlet
- Many different settings
  - 12, 15, 20, 25, 30, 35

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# Header Hose

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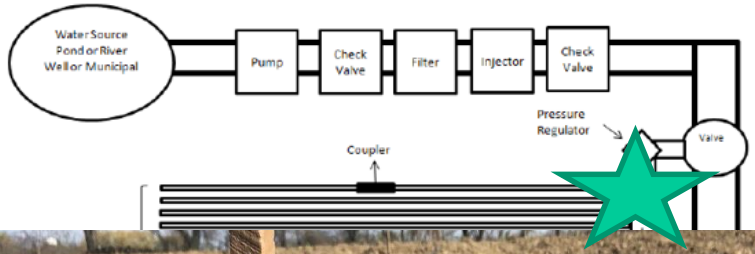


# Drip Tape

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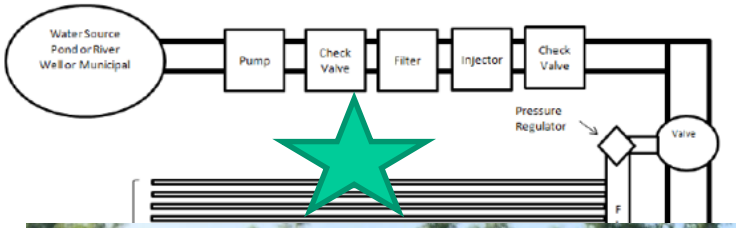


- Flat low pressure tube
- Various spaced emitters
  - 12” most common
- Various flow rates
  - 0.22 low flow
  - 0.45 high flow
- Install stripe/emitters up

# Drip Tape (Annual Systems)

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## 508 (Size & Mil) 12 (Spacing) 450 (Flow Rate)

## 508 – 12 – 450

Flow Rates 450 means 0.45 Gallons of water per minute emitted per 100 row feet

| Spacing | Flow Rate gpm per 100 ft | | |
|---|---|---|---|
| 12 High | 0.45 | 50812450 | 524 ft |
| 12 Low | 0.22 | 50812220 | 835 ft |
| 8 High | 0.50 | 50808500 | 487 ft |
| 8 Low | 0.34 | 50808340 | 645 ft |
| 6 High | 0.67 | 50806670 | 412 ft |
| 6 low | 0.50 | 50806500 | 487 ft |
| 4 | 0.67 | 50804670 | 412 ft |

# Flow Control Tape

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- Pressure moderating
- Longer rows
- Uniform yields
- Hilly terrain
- Ideal for heavy feeders

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# Flow Control Drip Tape

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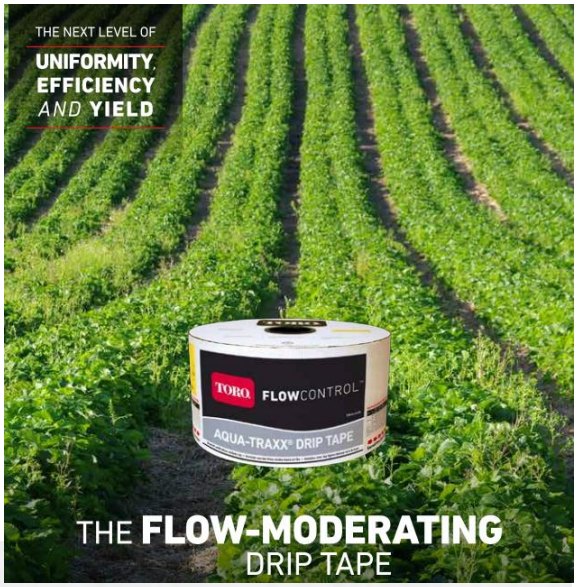
- Conserve water
- Apply evenly
- Hilly land
- Low cost big improvement




ADVANTAGE 1 **MORE UNIFORM OUTPUT FOR ANY TERRAIN**

## STANDARD TAPE

Standard tapes stress plants and reduce yield and efficiency by over- or under-watering as pressure changes throughout the run.

**RESULT:** Wasted water and fertilizer, stressed plants and reduced yields.


## AQUA-TRAXX® FC

Toro Aqua-Traxx FC gives you uniform output regardless of elevation changes. So now you can adjust the amount of water you give your plants on hilly terrain, and they'll all receive the same amount through our uniform delivery system.

**RESULT:** More uniform plants and higher yields even in hilly terrain that might otherwise be impractical to farm.

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# Pressure Moderating

**Brookdale Fruit Farm Inc**
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**⅝" DIAMETER**
Length of Run (ft) @ 10 psi for 90% EU

| | Slopes | | | | |
|---|---|---|---|---|---|
| Q-100 | -2% | -1% | 0% | +1% | +2% |
| 0.09 | 240 | 456 | 1441 | 1874 | 318 |
| 0.11 | 259 | 481 | 1298 | 1719 | 368 |
| 0.13 | 237 | 442 | 1148 | 1523 | 337 |
| 0.14 | 256 | 462 | 1074 | 1424 | 1249 |
| 0.17 | 255 | 454 | 999 | 1324 | 1216 |
| 0.22 | 249 | 424 | 835 | 1095 | 1074 |
| 0.25 | 246 | 411 | 762 | 987 | 996 |
| 0.28 | 243 | 397 | 699 | 910 | 924 |
| 0.29 | 243 | 392 | 687 | 885 | 907 |
| 0.30 | 243 | 387 | 674 | 874 | 896 |
| 0.34 | 240 | 381 | 645 | 824 | 849 |
| 0.38 | 236 | 362 | 586 | 737 | 774 |
| 0.42 | 231 | 347 | 544 | 683 | 772 |
| 0.44 | 231 | 343 | 537 | 674 | 712 |
| 0.45 | 230 | 341 | 524 | 650 | 695 |
| 0.50 | 224 | 324 | 487 | 608 | 649 |
| 0.56 | 218 | 311 | 449 | 555 | 597 |
| 0.66 | 212 | 291 | 410 | 499 | 537 |
| 0.67 | 212 | 293 | 412 | 505 | 544 |
| 0.84 | 196 | 261 | 349 | 418 | 449 |
| 0.88 | 193 | 256 | 341 | 406 | 437 |
| 0.90 | 193 | 255 | 337 | 399 | 431 |
| 1.00 | 187 | 240 | 312 | 372 | 399 |
| 1.12 | 180 | 228 | 291 | 341 | 368 |
| 1.33 | 169 | 211 | 262 | 305 | 330 |
| 1.34 | 168 | 209 | 259 | 299 | 324 |
| 1.68 | 155 | 186 | 224 | 256 | 277 |
| 2.65 | 128 | 145 | 168 | 187 | 202 |

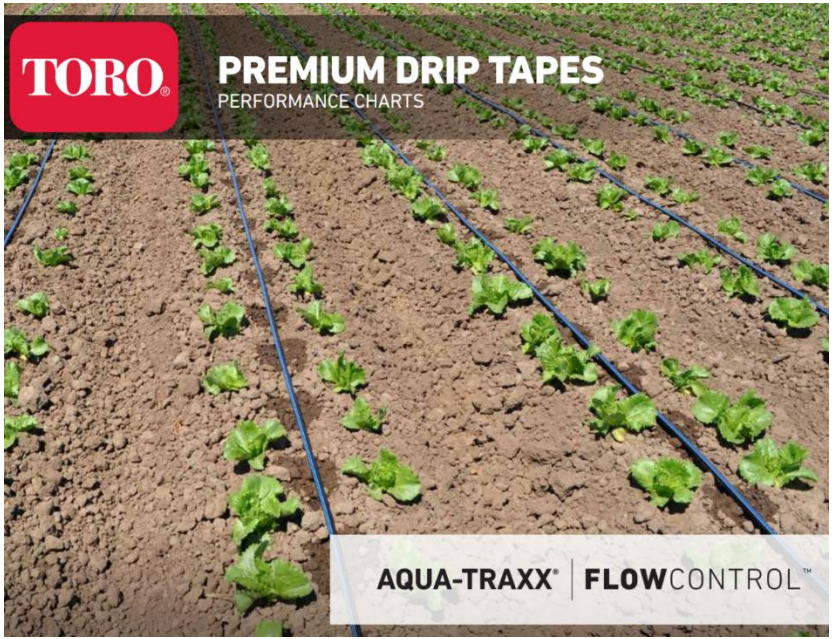
**⅝" DIAMETER**
Length of Run (ft) @ 10 psi for 90% EU

| | Slopes | | | | |
|---|---|---|---|---|---|
| Q-100 | -2% | -1% | 0% | +1% | +2% |
| 0.11 | 386 | 691 | 1568 | 2072 | 1970 |
| 0.17 | 374 | 629 | 1191 | 1547 | 1572 |
| 0.22 | 367 | 586 | 1008 | 1290 | 1338 |
| 0.25 | 360 | 555 | 921 | 1166 | 1222 |
| 0.30 | 349 | 524 | 820 | 1024 | 1085 |
| 0.34 | 343 | 504 | 762 | 949 | 1012 |
| 0.45 | 322 | 448 | 633 | 770 | 824 |
| 0.50 | 312 | 424 | 591 | 712 | 769 |
| 0.67 | 290 | 374 | 493 | 583 | 629 |
| 0.90 | 261 | 324 | 406 | 472 | 506 |

12 inch 0.22 gpm

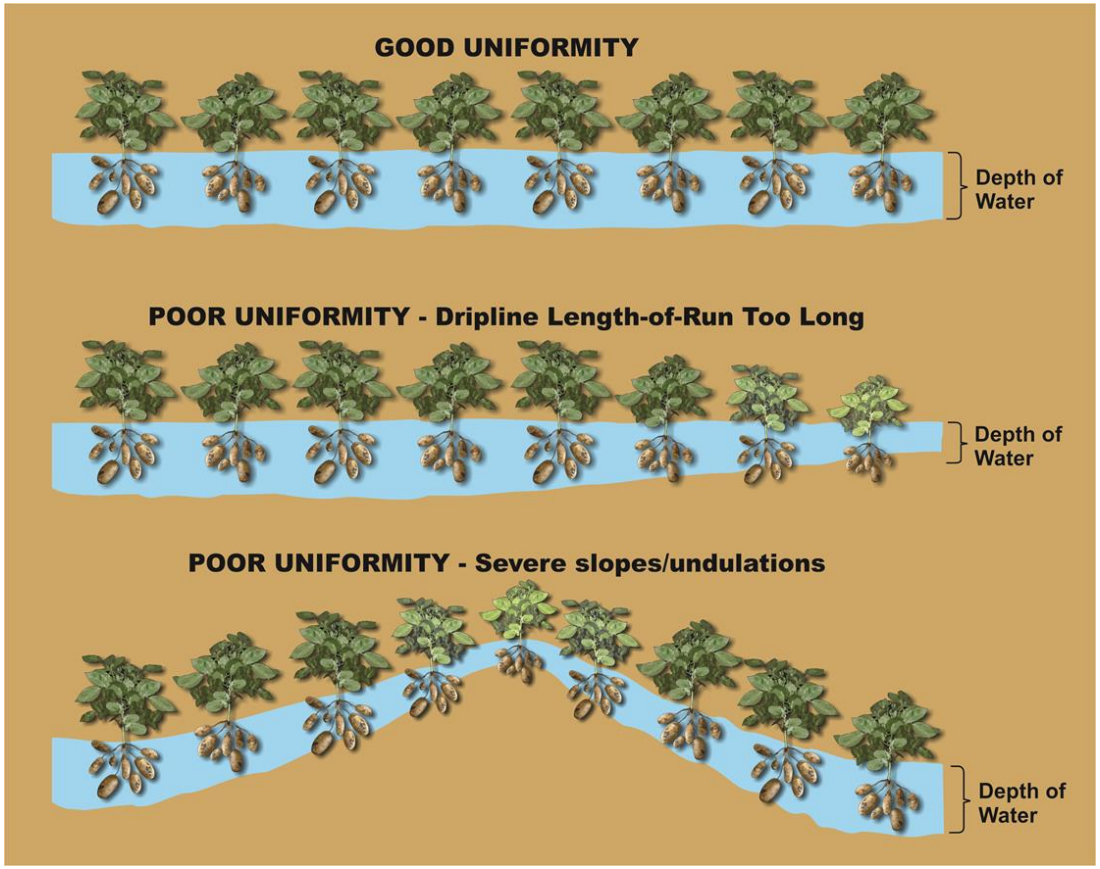
Standard tape 835 feet

Flow Control 1008 feet



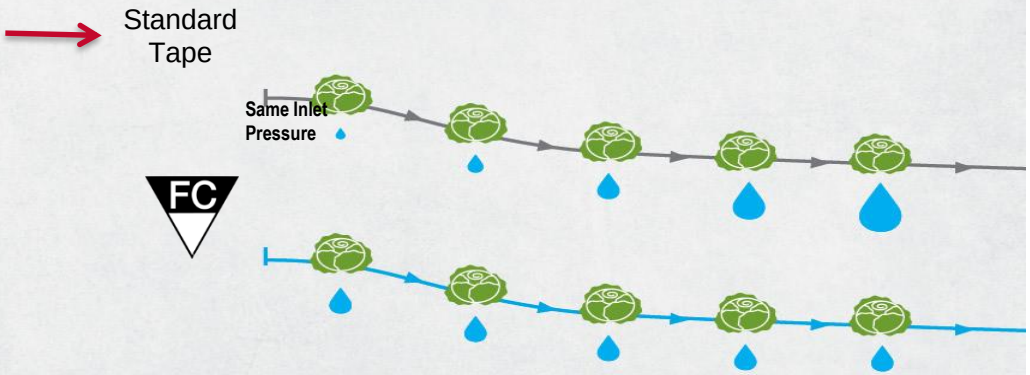
TORO. Count on it.

# UNIFORMITY

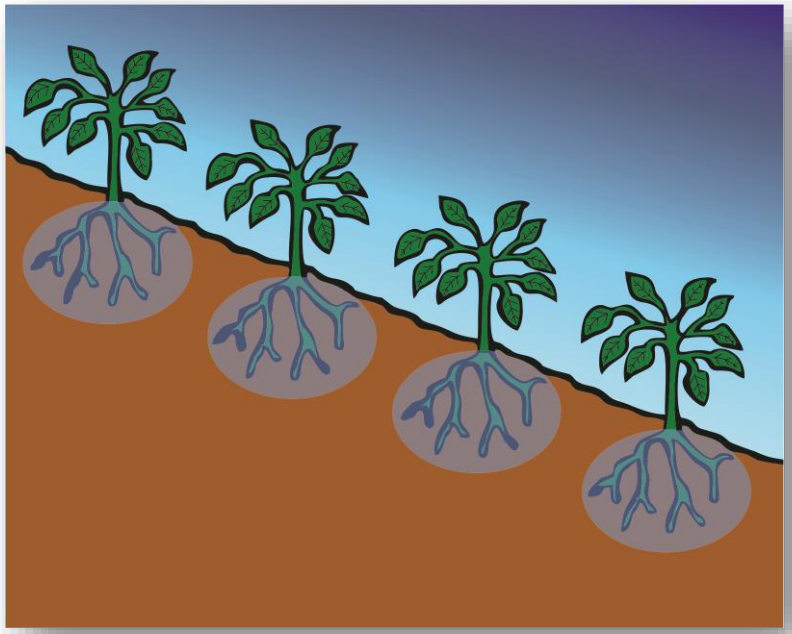


# Classic Tape vs. Flow Control

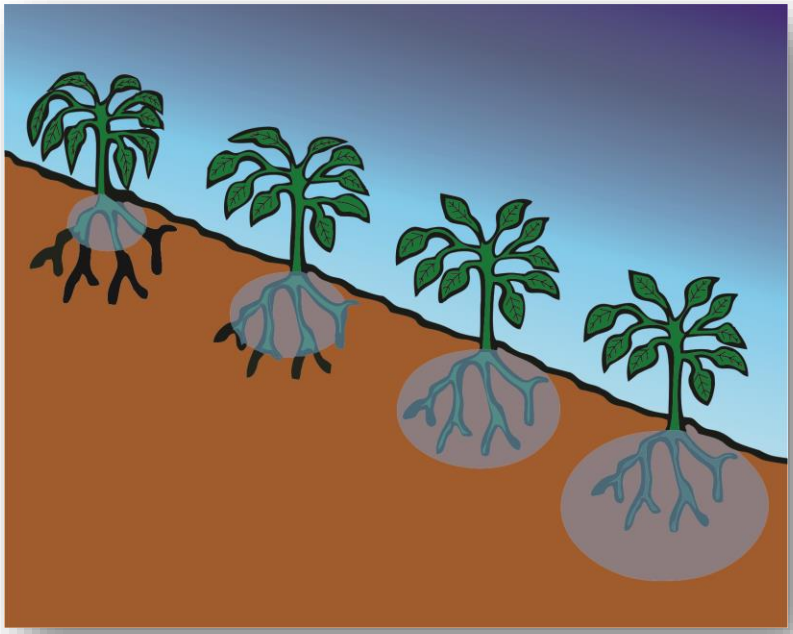
- More water at lower elevations
- Less water at higher elevations
- Wastes water, fertilizer
- Runoff, deep percolation
- Less yield, quality
- Crop stress



# Tape Selection



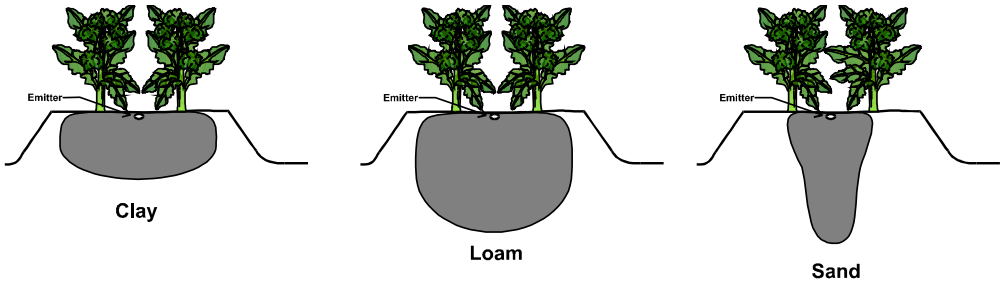
*Compensating Emitters (FC)*



*Non-Compensating Emitters*

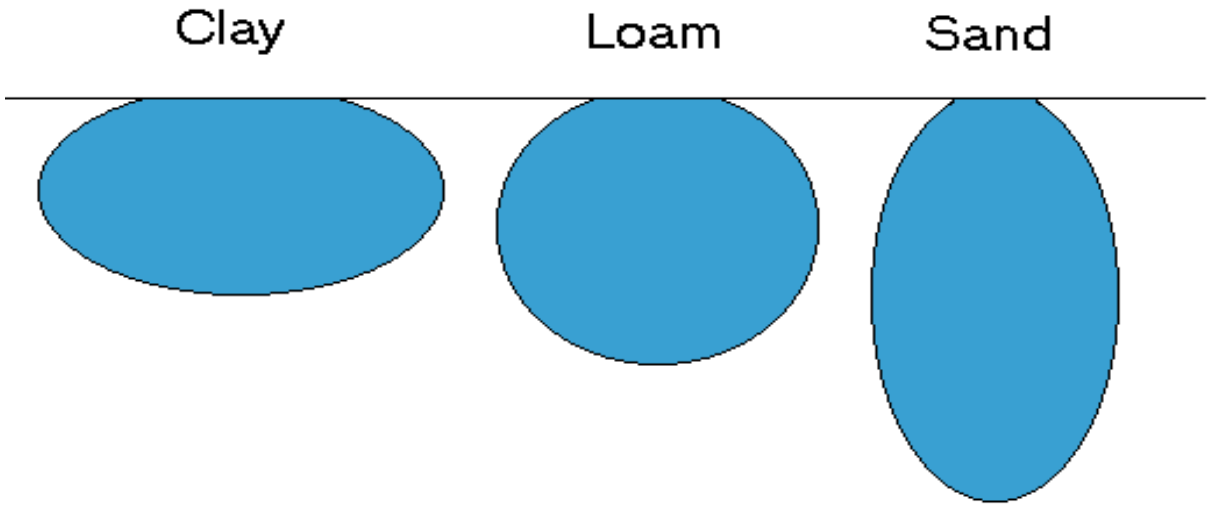
# Soil Type Considerations

- Water holding capacity varies in different soil types
  - Clay
  - Loam
  - Sand




- Water holding capacity helps determine drip tape emitter spacing

# Moisture Lateral Movement

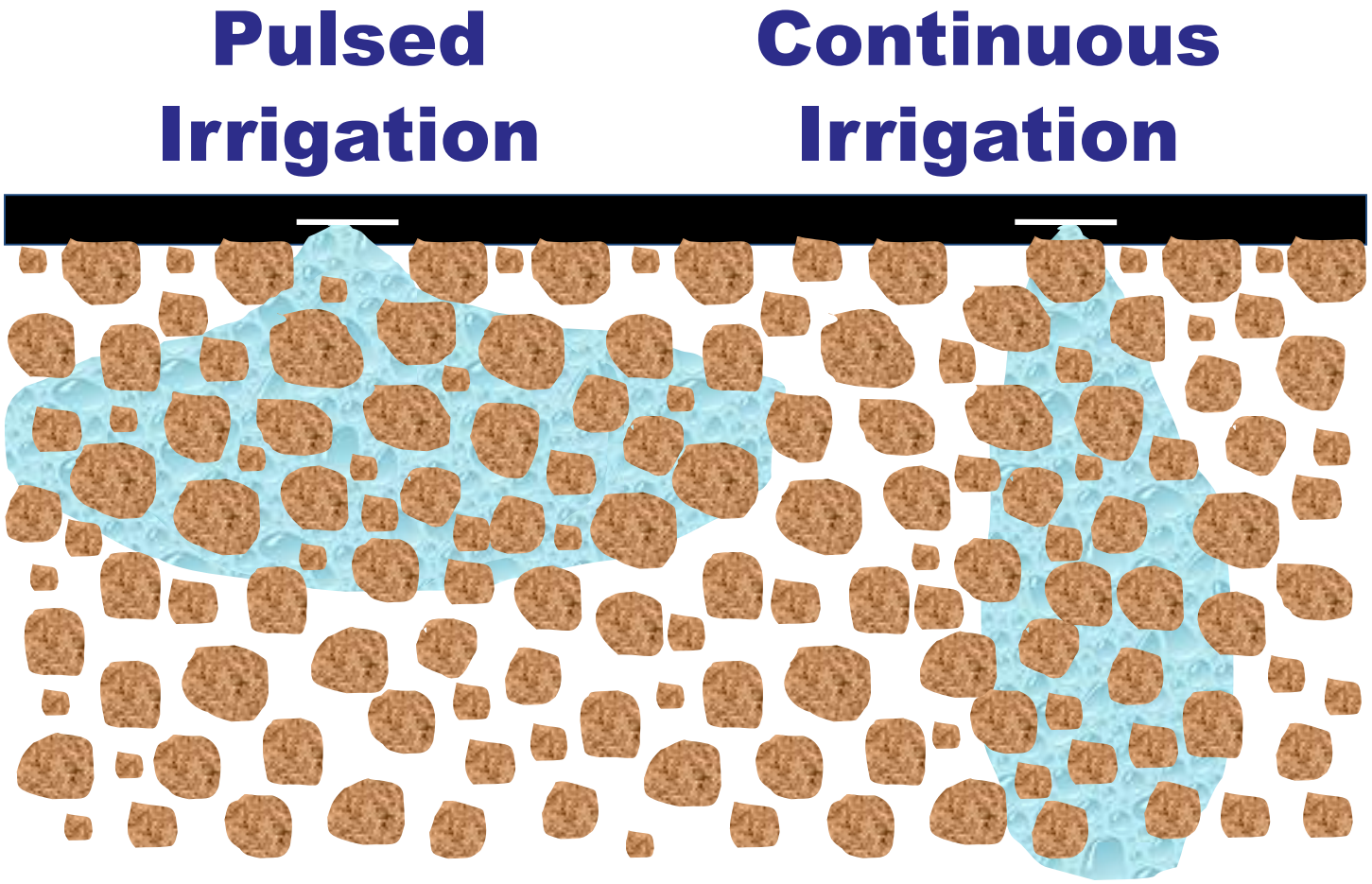



| Approximate Lateral Movement | |
|---|---|
| • Coarse Sand | 0.5 - 1.5 feet |
| • Fine Sand | 1.0 - 3.0 feet |
| • Loam | 3.0 - 4.5 feet |
| • Heavy Clay | 4.0 - 6.0 feet |

TORO. Count on it.

# Water Holding Capacity

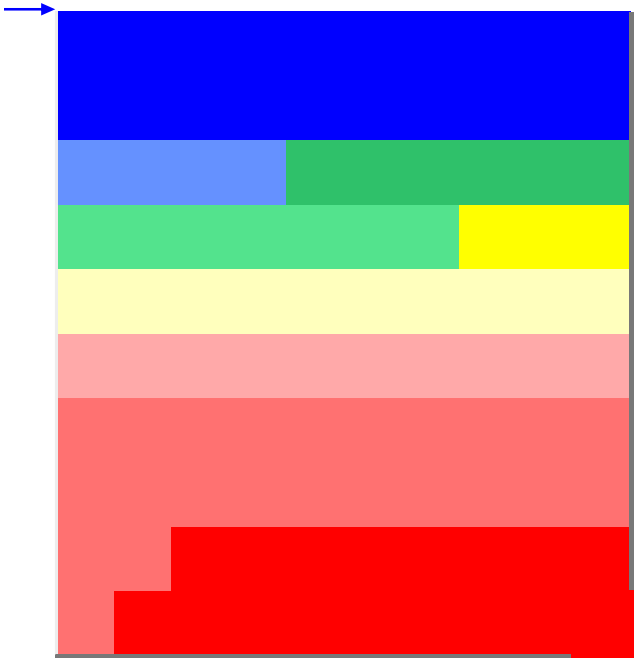
| Soil Type | Inches per Foot |
| --- | --- |
| • SAND ---------- | 0.25 - 1.00 |
| • LOAMY SAND ---- | 0.75 - 1.50 |
| • LOAM AND SILT LOAM | 1.25 - 1.75 |
| • CLAY LOAM ----- | 2.00 - 2.75 |
| • CLAY ---------- | 1.75 - 2.50 |


Pulsed Irrigation
Continuous Irrigation

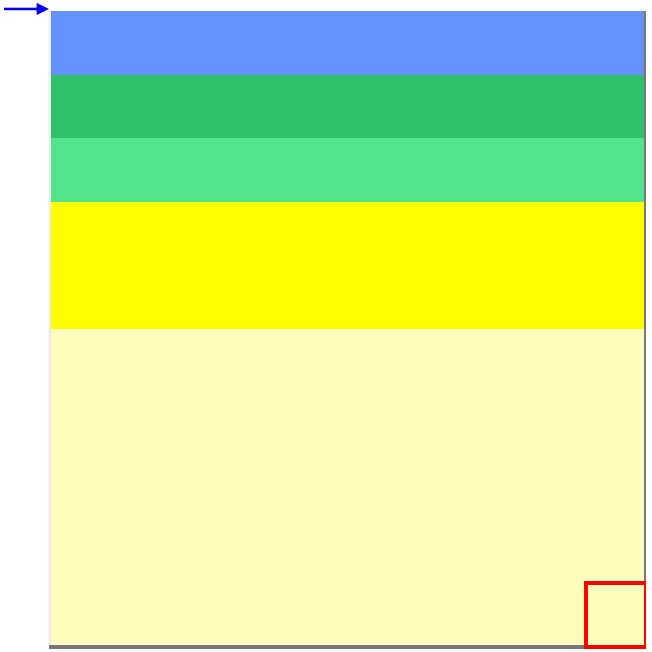
# Compound Slope

# Long Rows - Different Flows

650’ Row 8” .67 Q-100’

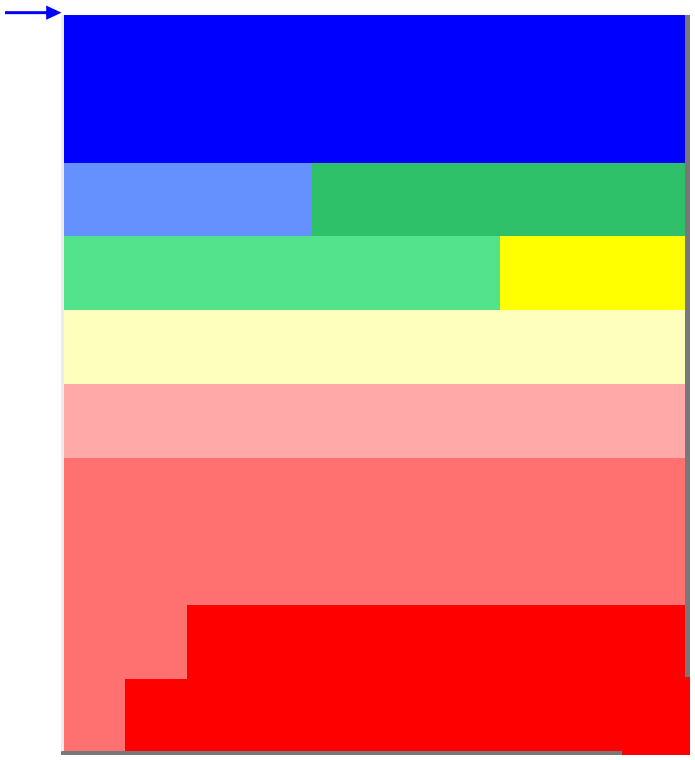


650’ Row 8” .34 Q-100’

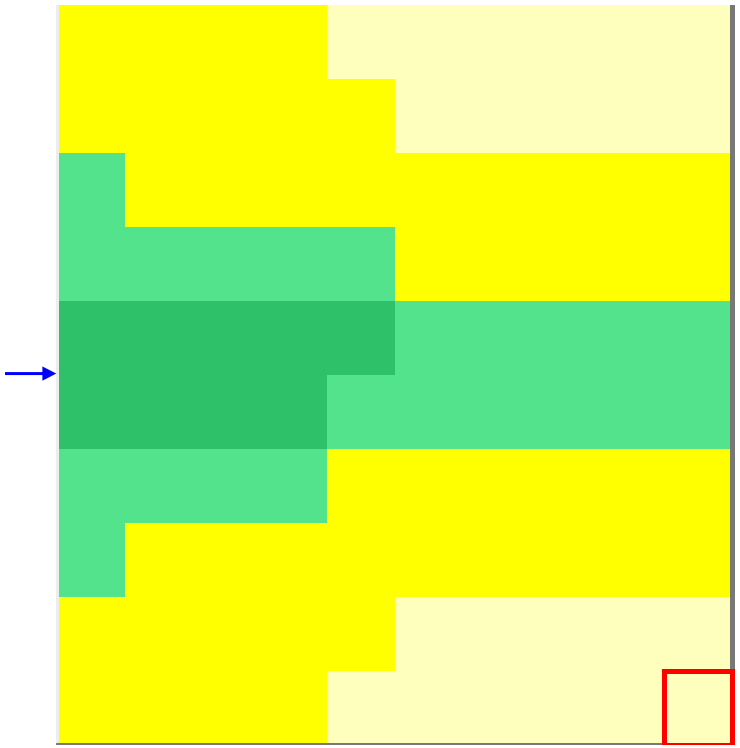


# Long Rows – Manifold Location

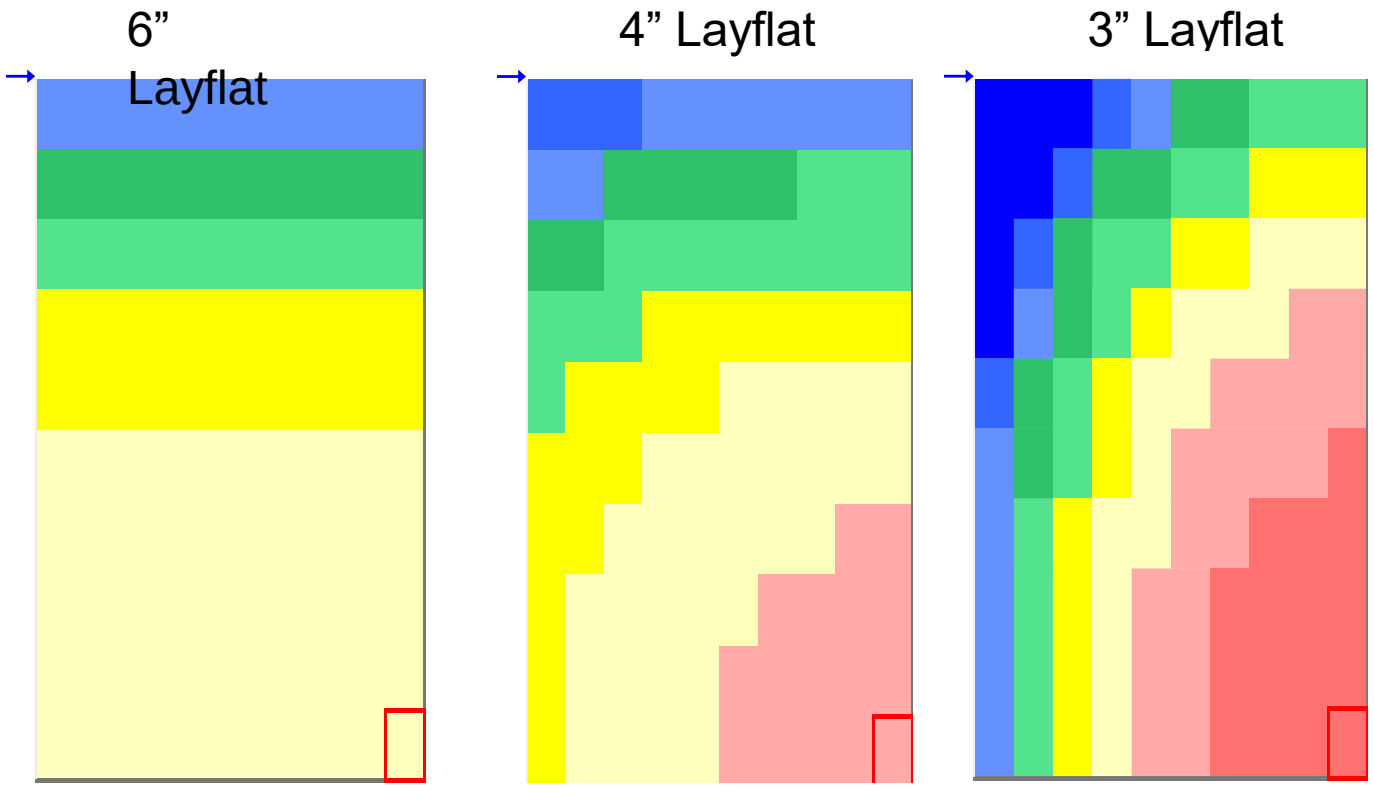
650’ Row 8” .67 Q-100’



Center-feed Same Row



# Sub-Main / Manifold Size



# Friction Loss Charts
# Oval Hose Pressure Loss

**Friction Loss Charts for ID Controlled 21 psi Oval Hose**

**Losses in psi per 100 feet of hose (psi/100 ft) for hose sizes: 26 mm (1.043") ID through 100 mm (3.996") ID**

| Part No. | | EID2626 | | ELD3550 | | ELD4040 | | ELD5251 | | ELD7776 | | ELD101100 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nom. ID | | 1.043" | | 1.365" | | 1.595" | | 2.052" | | 3.043" | | 3.996" | |
| Min. ID | | 1.040" | | 1.360" | | 1.590" | | 2.047" | | 3.038" | | 3.991" | |
| Nom. Wall | | 0.026" | | 0.050" | | 0.040" | | 0.051" | | 0.076" | | 0.100" | |
| Flow | | Velocity | Loss | Velocity | Loss | Velocity | Loss | Velocity | Loss | Velocity | Loss | Velocity | Loss |
| GPM | GPH | FPS | Psi | FPS | Psi | FPS | Psi | FPS | Psi | FPS | Psi | FPS | Psi |
| 1 | 60 | 0.38 | 0.04 | 0.22 | 0.01 | 0.16 | 0.01 | 0.10 | 0.00 | 0.03 | 0.00 | 0.03 | 0.00 |
| 2 | 120 | 0.76 | 0.14 | 0.44 | 0.04 | 0.32 | 0.02 | 0.19 | 0.01 | 0.05 | 0.00 | 0.05 | 0.00 |
| 3 | 180 | 1.13 | 0.30 | 0.66 | 0.08 | 0.48 | 0.04 | 0.29 | 0.01 | 0.08 | 0.00 | 0.08 | 0.00 |
| 4 | 240 | 1.51 | 0.52 | 0.88 | 0.14 | 0.65 | 0.07 | 0.39 | 0.02 | 0.10 | 0.00 | 0.10 | 0.00 |
| 5 | 300 | 1.89 | 0.79 | 1.10 | 0.21 | 0.81 | 0.10 | 0.49 | 0.03 | 0.13 | 0.00 | 0.13 | 0.00 |
| 6 | 360 | 2.27 | 1.10 | 1.33 | 0.30 | 0.97 | 0.14 | 0.58 | 0.04 | 0.15 | 0.00 | 0.15 | 0.00 |
| 7 | 420 | 2.64 | 1.46 | 1.55 | 0.40 | 1.13 | 0.19 | 0.68 | 0.05 | 0.18 | 0.00 | 0.18 | 0.00 |
| 8 | 480 | 3.02 | 1.87 | 1.77 | 0.51 | 1.29 | 0.24 | 0.78 | 0.07 | 0.21 | 0.00 | 0.21 | 0.00 |
| 9 | 540 | 3.40 | 2.33 | 1.99 | 0.63 | 1.45 | 0.30 | 0.88 | 0.09 | 0.23 | 0.00 | 0.23 | 0.00 |
| 10 | 600 | 3.78 | 2.83 | 2.21 | 0.77 | 1.62 | 0.36 | 0.97 | 0.10 | 0.26 | 0.00 | 0.26 | 0.00 |
| 12 | 720 | 4.53 | 3.97 | 2.65 | 1.08 | 1.94 | 0.50 | 1.17 | 0.15 | 0.31 | 0.01 | 0.31 | 0.01 |
| 14 | 840 | 5.29 | 5.29 | 3.09 | 1.43 | 2.26 | 0.67 | 1.36 | 0.20 | 0.36 | 0.01 | 0.36 | 0.01 |
| 16 | 960 | 6.04 | 6.77 | 3.53 | 1.83 | 2.59 | 0.86 | 1.56 | 0.25 | 0.41 | 0.01 | 0.41 | 0.01 |
| 18 | 1,080 | 6.80 | 8.42 | 3.98 | 2.28 | 2.91 | 1.06 | 1.75 | 0.31 | 0.46 | 0.01 | 0.46 | 0.01 |
| 20 | 1,200 | 7.55 | 10.23 | 4.42 | 2.77 | 3.23 | 1.29 | 1.95 | 0.38 | 0.51 | 0.01 | 0.51 | 0.01 |
| 25 | 1,500 | 9.44 | 15.47 | 5.52 | 4.19 | 4.04 | 1.96 | 2.44 | 0.57 | 0.64 | 0.02 | 0.64 | 0.02 |
| 30 | 1,800 | 11.33 | 21.68 | 6.63 | 5.87 | 4.85 | 2.74 | 2.92 | 0.80 | 0.77 | 0.03 | 0.77 | 0.03 |
| 35 | 2,100 | 13.22 | 28.84 | 7.73 | 7.81 | 5.66 | 3.65 | 3.41 | 1.07 | 0.90 | 0.04 | 0.90 | 0.04 |
| 40 | 2,400 | 15.11 | 36.94 | 8.83 | 10.00 | 6.46 | 4.67 | 3.90 | 1.37 | 1.03 | 0.05 | 1.03 | 0.05 |
| 45 | 2,700 | 17.00 | 45.94 | 9.94 | 12.44 | 7.27 | 5.81 | 4.39 | 1.70 | 1.99 | 0.25 | 1.15 | 0.07 |
| 50 | 3,000 | | | 11.04 | 15.12 | 8.08 | 7.06 | 4.87 | 2.06 | 2.21 | 0.30 | 1.28 | 0.08 |
| 55 | 3,300 | | | 12.15 | 18.04 | 8.89 | 8.43 | 5.36 | 2.46 | 2.43 | 0.36 | 1.41 | 0.10 |
| 60 | 3,600 | | | 13.25 | 21.19 | 9.70 | 9.90 | 5.85 | 2.89 | 2.66 | 0.42 | 1.54 | 0.11 |
| 65 | 3,900 | | | 14.36 | 24.58 | 10.50 | 11.48 | 6.34 | 3.36 | 2.88 | 0.49 | 1.67 | 0.13 |
| 70 | 4,200 | | | 15.46 | 28.19 | 11.31 | 13.17 | 6.82 | 3.85 | 3.10 | 0.56 | 1.80 | 0.15 |
| 75 | 4,500 | | | | | 12.12 | 14.97 | 7.31 | 4.37 | 3.32 | 0.64 | 1.92 | 0.17 |
| 80 | 4,800 | | | | | 12.93 | 16.87 | 7.80 | 4.93 | 3.54 | 0.72 | 2.05 | 0.19 |
| 85 | 5,100 | | | | | 13.73 | 18.87 | 8.29 | 5.51 | 3.76 | 0.81 | 2.18 | 0.21 |
| 90 | 5,400 | | | | | 14.54 | 20.98 | 8.77 | 6.13 | 3.98 | 0.90 | 2.31 | 0.24 |
| 100 | 6,000 | | | | | | | 9.75 | 7.45 | 4.43 | 1.09 | 2.56 | 0.29 |
| 110 | 6,600 | | | | | | | 10.72 | 8.89 | 4.87 | 1.30 | 2.82 | 0.34 |
| 120 | 7,200 | | | | | | | 11.70 | 10.44 | 5.31 | 1.53 | 3.08 | 0.40 |
| 130 | 7,800 | | | | | | | 12.67 | 12.11 | 5.75 | 1.77 | 3.33 | 0.47 |
| 140 | 8,400 | | | | | | | 13.65 | 13.90 | 6.20 | 2.03 | 3.59 | 0.54 |
| 150 | 9,000 | | | | | | | 14.62 | 15.79 | 6.64 | 2.31 | 3.85 | 0.61 |
| 160 | 9,600 | | | | | | | 15.60 | 17.79 | 7.08 | 2.60 | 4.10 | 0.69 |
| 170 | 10,200 | | | | | | | 16.57 | 19.91 | 7.52 | 2.91 | 4.36 | 0.77 |
| 180 | 10,800 | | | | | | | 17.55 | 22.13 | 7.97 | 3.24 | 4.62 | 0.86 |
| 190 | 11,400 | | | | | | | | | 8.41 | 3.58 | 4.87 | 0.95 |
| 200 | 12,000 | | | | | | | | | 8.85 | 3.93 | 5.13 | 1.04 |
| 250 | 15,000 | | | | | | | | | 11.07 | 5.95 | 6.41 | 1.57 |
| 300 | 18,000 | | | | | | | | | 13.28 | 8.33 | 7.69 | 2.21 |


Aqua Traxx
EA5150834-400
Dia - 15 Mil – 8 Inch
0.34 Q100 @ 8 PSI
.13 GPH / EMITTER
4000 FEET PER ROLL
BLUE STRIPES UP
Aqua Traxx
Flow Control
EAFC5xx1234
10 PSI
5/8 Dia. 12 in. Spacing
0.34 Q100 @ 8 PSI
0.20 GPH / EMITTER
BLUE STRIPES UP
Aqua Traxx
EA5xx1234
10 PSI
5/8 Dia 12 in. Spacing
0.34 Q100 @ 8 PSI
0.20 GPH / EMITTER
BLUE STRIPES UP
Aqua Traxx
Flow Control
EAFC5xx1222
10 PSI
5/8 Dia, 12 in. Spacing
0.22 Q100 @ 8 PSI
.13 GPH / EMITTER
BLUE STRIPES UP

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# Tool & Fittings

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# End Plug

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Install with Lines Facing UP
TORO TAPE BLUE TO THE SKY

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# Helpful Tools

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- Impact tool for hose clamps
- Liquid Teflon
- Scissors for drip tape
- Sharp Knife
- Paint Marker

# Install

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1. Lay Plastic
2. Pump, Filter and Injector
3. Place H station in middle of zone
4. Run lay flat from pump/filter to H station
5. Connect Header Hose to H station
6. Punch starters in to header
7. Turn water on
8. Connect tape
9. Walk to end of field, put on end caps
10. Check System for leaks
11. Transplant

# System Operation

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| Tape | Row Ft | GPM | 4 Hour Gallons | Cycles per Week |
|---|---|---|---|---|
| 0.45 | 7210 | 32 | 7787 | 3.49 |
| 0.22 | 7210 | 16 | 3807 | 7 |

1. Open zones
2. Check Oil
3. Start pump
4. Backflush filter
5. Check for leaks
6. Check pressure in field

# Fertigation

**Brookdale Fruit Farm Inc**
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(603) 465 2240

- Water Soluble Fertilizer is a must!

| Brand | Formula | Name | Type |
|---|---|---|---|
| Plant Marvel | 12-5-19 | Veggie Special | Conv |
| Plant Marvel | 15-5-30 | K Mag | Conv |
| Plant Marvel | 15-0-15 | Hi-Cal Special | Conv |
| Plant Marvel | 12-45-10 | Super Start | Conv |
| Nutri Ag | 12-0-1 | | OMRI |
| Nutri Ag | 5-0-20 | | OMRI |
| Nutri Ag | 0-0-44 | Potassium | OMRI |
| Nutri Ag | | Calcium | OMRI |
| Nutri Ag | | Zinc | OMRI |
| Nutri Ag | | Boron | OMRI |
| Neptunes Harvest | 2-4-1 | Fish | OMRI |
| Neptunes Harvest | 2-3-1 | Fish and Seaweed | OMRI |
| Neptunes Harvest | 2-4-2 | Tomato Veg | |
| Neptunes Harvest | 2-6-2 | Rose and Flowering | |

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# Fertigation

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# Sample Schedule

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| Stage | Fertilizer | Amount |
|---|---|---|
| Transplant | 12-45-10 | 1/2 bag (12.5 lbs) |
| Week 1 | 12-45-10 | 1/2 bag (12.5 lbs) |
| Week 2-Bloom | 12-5-19 | 1/2 bag (12.5 lbs) |
| Bloom-Harvest | 15-5-30 | 1/2 bag (12.5 lbs) |


- Prior to putting the fertilizer through fill the lines for 20-30 minutes!
- Rinse with clear water for 15 minutes after

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# Weed Mat

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- 1.77 OZ Black Row Cover Fabric
- UV Stabilized
- Pinned every 3 feet with staples
- 3 to 5 year life span
- Re useable weed barrier for field or greenhouse

- Brookdale Fruit Farm exclusive product
- Permeable for rain water filtration
- Cost effective weeding solution
- 4 and 5 foot widths

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# Weed Mat

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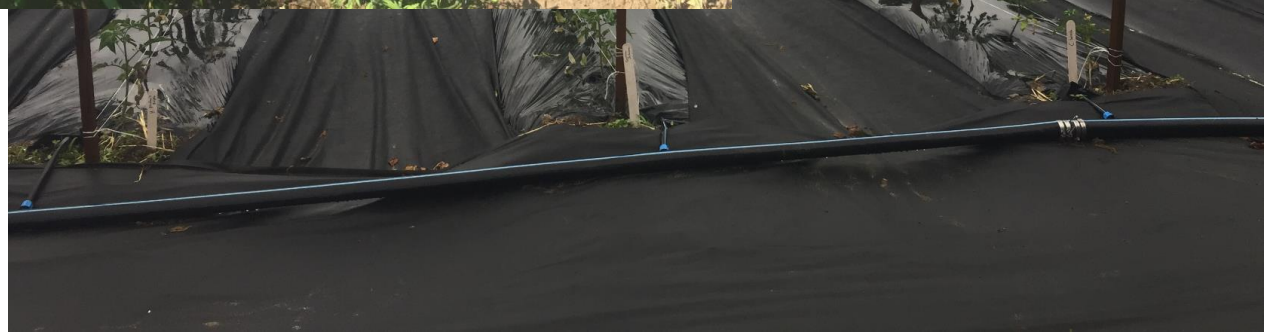

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# Is Soil Wet? #1

**Brookdale Fruit Farm Inc**
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(603) 465 2240

- How to check moisture level
  - Moisture meter
  - Feel method
- Trees measure at 20” and 40”
- Blues Raspberry at 12” and 24”
- Strawberry at 6” and 12”

Taking Data is only good if you act on it

**25 to 50 percent available 1.6 to 0.8 inches per foot depleted**

Slightly moist, forms a weak ball with rough surfaces, no water staining on fingers, few aggregated soil grains break away.

**50 to 75 percent available 1.1 to 0.4 inches per foot depleted**

Moist, forms a ball, very light staining on fingers, darkened color, pliable, forms a weak ribbon between the thumb and forefinger.

**75 to 100 percent available 0.5 to 0.0 inches per foot depleted**

Wet, forms a ball with well-defined finger marks, light to heavy soil/water coating on fingers, ribbons between thumb and forefinger.

| Available Soil Moisture Percent | Coarse Texture | Moderately Coarse Texture | Medium Texture | Fine Texture |
|---|---|---|---|---|
| Soil Texture | Fine Sand and Loamy Fine Sand | Sandy Loam and Fine Sandy Loam | Sandy Clay Loam, Loam, and Silt Loam | Clay, Clay Loam, or Silty Clay Loam |
| Available Soil Moisture Percent | Available Water Capacity 0.6 to 1.2 inches per foot | Available Water Capacity 1.3 to 1.7 inches per foot | Available Water Capacity 1.5 to 2.1 inches per foot | Available Water Capacity 1.6 to 2.4 inches per foot |
| 0 to 25 | Dry, loose, will hold together if not disturbed, loose sand grains on fingers with applied pressure. SMD 1.2 to 0.5 | Dry, forms a very weak ball, aggregated soil grains break away easily from ball. SMD 1.7 -1.0 | Dry. Soil aggregations break away easily. no moisture staining on fingers, clods crumble with applied pressure. SMD 2.1-1.1 | Dry, soil aggregations easily separate, clods are hard to crumble with applied pressure SMD 2.4-1.2 |
| 25 to 50 | Slightly moist, forms a very weak ball with well-defined finger marks, light coating of loose and aggregated sand grains remain on fingers. SMD O.9-0.3 | Slightly moist, forms a weak ball with defined finger marks, darkened color, no water staining on fingers, grains break away. SMD 1.3-0.7 | Slightly moist, forms a weak ball with rough surfaces, no water staining on fingers, few aggregated soil grains break away. SMD1.6-0.8 | Slightly moist, forms a weak ball, very few soil aggregations break away, no water stains, clods flatten with applied pressure SMD 1.8-0.8 |
| 50 to 75 | Moist, forms a weak ball with loose and aggregated sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon. SMD O.6-0.2 | Moist, forms a ball with defined finger marks. very light soil/water staining on fingers. darkened color, will not slick. SMD O.9-0.3 | Moist, forms a ball, very light water staining on fingers, darkened color, pliable, forms a weak ribbon between thumb and forefinger. SMD 1.1- 0.4 | Moist. forms a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger. SMD l.2-0.4 |
| 75 to 100 | Wet, forms a weak ball, loose and aggregated sand grains remain on fingers, darkened color, heavy water staining on fingers, will not ribbon. SMD O.3-0.0 | Wet, forms a ball with wet outline left on hand, light to medium water staining on fingers, makes a weak ribbon between thumb and forefinger. SMD O.4-0.0 | Wet, forms a ball with well defined finger marks, light to heavy soil/water coating on fingers, ribbons between , thumb and forefinger. SMD O.5 -0.0 | Wet, forms a ball, uneven medium to heavy soil/water coating on fingers, ribbons easily between thumb and forefinger. SMD O.6-0.0 |
| Field Capacity (100 percent) | Wet, forms a weak ball, moderate to heavy soil/water coating on fingers, wet outline of soft ball remains on hand. SMD 0.0 | Wet, forms a soft ball, free water appears briefly on soil surface after squeezing or shaking,medium to heavy soil/water coating on fingers. SMD 0.0 | Wet, forms a soft ball, free water appears briefly on soil surface after squeezing or shaking, medium to heavy soil/water coating on fingers. SMD 0.0 | Wet, forms a soft ball, free water appears on soil surface after squeezing or shaking, thick soil/water coating on fingers, slick and sticky. SMD 0.0 |

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/mt/technical/ecoscience/agronomy/?cid=nrcs144p2_056491

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# Moisture Meters

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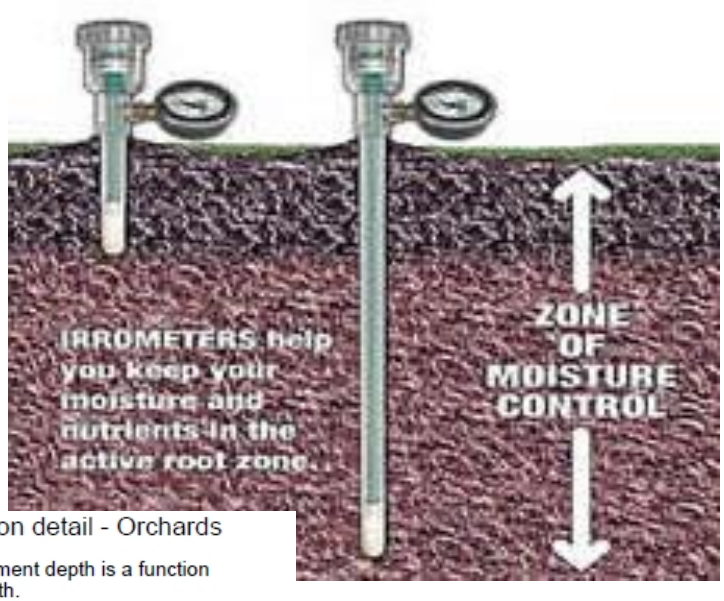
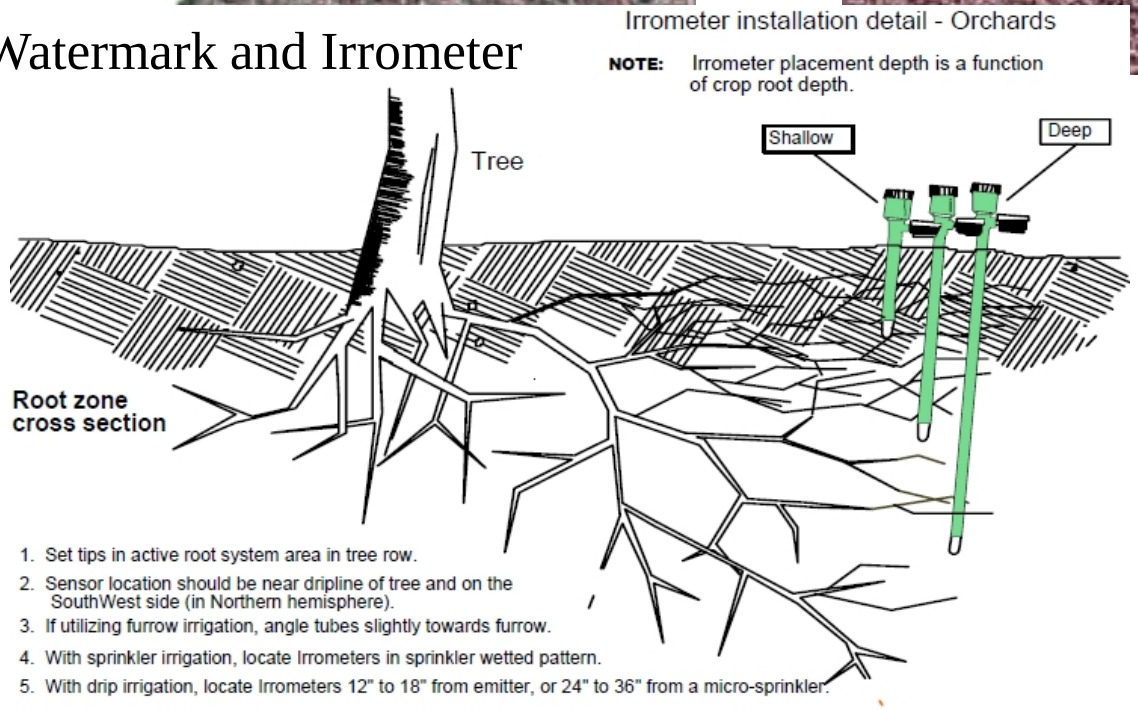



Watermark and Irrometer




Watermark and Irrometer
Scale 0 to 100
0 is wet 100 is dry
Above 40 turn water on
Shut off when hit 20

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# Sensor Information

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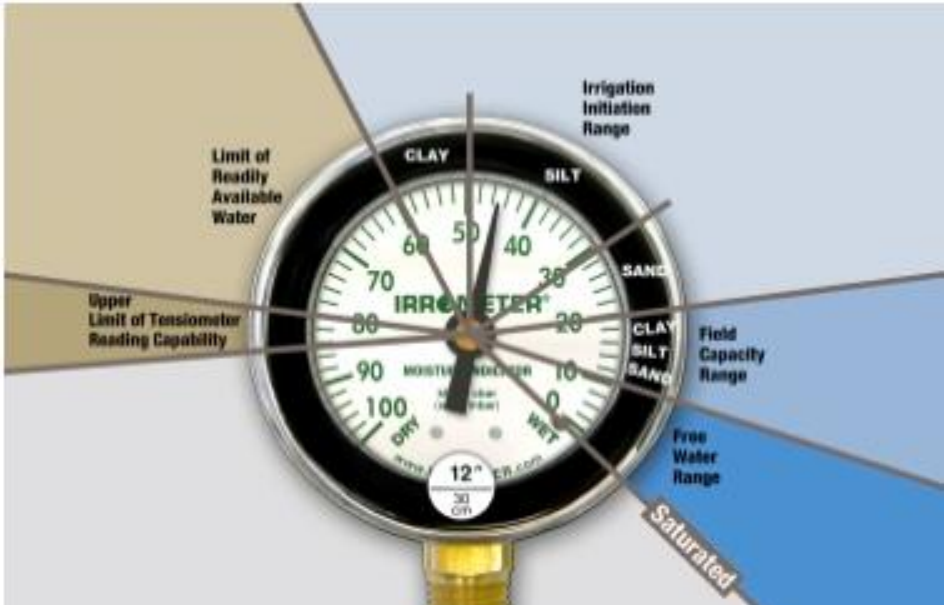


- **0-10 Centibars** = Saturated soil
- **10-30 Centibars** = Soil is adequately wet (except coarse sands, which are beginning to lose water)
- **30-60 Centibars** = Usual range for irrigation (most soils)
- **60-100 Centibars** = Usual range for irrigation in heavy clay

- Two sensors at 6” and 12” depth

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# Rainfall vs Soil Moisture 16

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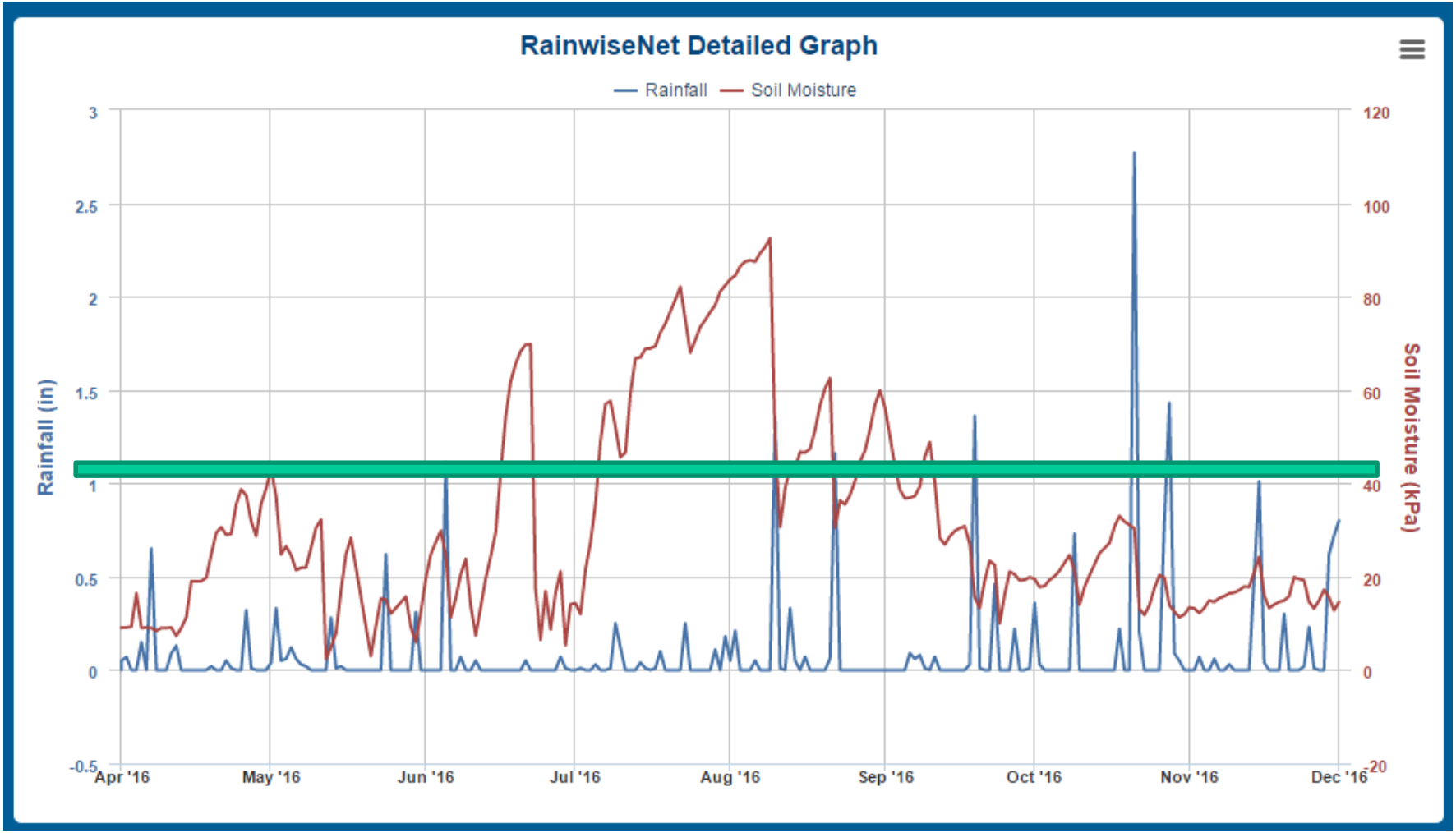

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# System Design

**Brookdale Fruit Farm Inc**
38 Broad St Hollis NH 03049
(603) 465 2240

| | | | | | | |
|---|---|---|---|---|---|---|
| | | **Brookdale Fruit Farm Irrigation and Row Crop Supplies** | | | **Date** | 12/27/2016 |
| | | **38 Broad St PO Box 389 Hollis NH 03049 603 465 2240** | | | | |
| | **Customer** | | | **Irrigation Sales Slip** | Prepared by | |
| | Name | | | | Trevor Hardy | |
| | Address | | | | 603 860 1657 | |
| | Contact | | | | | |
| | | **Quantity** | **Units** | **Description** | **Unit Price** | **Total** |
| 1 | | | | | | $0.00 |
| 2 | | 3400 | feet | 2 inch poly pipe 100 psi | $0.97 | $3,298.00 |
| 3 | **filter** | 1 | assembly | 2 inch single disc filter built to backflush on cam locks | $490.00 | $490.00 |
| 4 | **injector** | 1 | assembly | 2 x 3/4 fertilizer injector | $305.00 | $305.00 |
| 5 | **fittings** | **30** | feet | 2 inch red layflat hose connect filter and injector well | $1.25 | $37.50 |
| 6 | | **4** | each | 2 inch cam lock c | $7.50 | $30.00 |
| 7 | | **5** | each | 2 inch cam lock e | $4.50 | $22.50 |
| 8 | | **60** | each | 2 inch super clamps 56-59 | $5.00 | $300.00 |
| 9 | | **12** | each | dravity drain assembly | $38.00 | $456.00 |
| 10 | | **15** | each | 2 inch insert caps | $2.25 | $33.75 |
| 11 | | **20** | each | 2 inch couplers | $1.55 | $31.00 |
| 12 | | **10** | each | 2 inch eblows | $1.85 | $18.50 |
| 13 | | **5** | each | 2 inch barbed tee | $4.00 | $20.00 |
| 14 | | | | | | $0.00 |
| 15 | | **39** | coils | 24 inch o.53 spacing orchard tubing | $155.00 | $6,045.00 |
| 16 | | **200** | each | xpando starter with grommet | $1.60 | $320.00 |
| 17 | | **200** | each | figure 8 end cap | $0.20 | $40.00 |
| 18 | | **100** | each | ram coupler | $0.35 | $35.00 |
| 19 | | | | | | $0.00 |
| 20 | | 3 | asssembly | 2 way pvc valve tower with pressure gauge and air vent | $175.00 | $525.00 |
| 21 | | 1 | asssembly | 3 way pvc valve tower with pressure gauge and air vent | $225.00 | $225.00 |
| 22 | | 1 | asssembly | 2 way flow diverter with zone b threaded | $110.00 | $110.00 |
| 23 | | | | | | $0.00 |
| 24 | | | | | | $0.00 |
| 25 | | | | | | $0.00 |
| 26 | | | | | | $0.00 |
| 27 | | | | | | $0.00 |
| 28 | | | | | | $0.00 |
| 29 | | | | | | $0.00 |
| 30 | | | | | | $0.00 |
| 31 | | | | | | $0.00 |
| 32 | | | | | | $0.00 |
| 33 | | | | | | $0.00 |
| 34 | | | | | | $0.00 |
| 35 | | | | | | $0.00 |
| 36 | | | | | | $0.00 |
| | Notes: | | | | | |
| | | | | | Total | $12,342.25 |




3 way valve tower
2 way valve tower
well
main line
sub main
gravity drain

| crop | FIELD | # rows | LENGTH | ROW FT | spacing | flow | gpm |
|---|---|---|---|---|---|---|---|
| apples | A | 6 | 420 | 2520 | 2 | 0.53 | 11.1 |
| apples | B | 11 | 210 | 2310 | 2 | 0.53 | 10.2 |
| apples | C1 | 8 | 500 | 4000 | 2 | 0.53 | 17.7 |
| apples | C2 | 10 | 300 | 3000 | 2 | 0.53 | 13.3 |
| apples | D1 | 10 | 450 | 4500 | 2 | 0.53 | 19.9 |
| apples | D2 | 10 | 360 | 3600 | 2 | 0.53 | 15.9 |
| xmas | E | 42 | 100 | 4200 | 2 | 0.53 | 18.6 |
| xmas | F | 40 | 150 | 6000 | 2 | 0.53 | 26.5 |
| apples | G | 7 | 250 | 1700 | 2 | 0.53 | 7.5 |
| xmas | H | 42 | 160 | 6720 | 2 | 0.53 | 29.7 |
| | | | 186 totals | 38550 | | | |

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# Questions?

**Brookdale Fruit Farm Inc**
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(603) 465 2240

Julian Post, Sept. 19

# Contact

**Brookdale Fruit Farm Inc**
38 Broad St Hollis NH 03049
(603) 465 2240

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RT 130 Hollis NH

TORO. Count on it.

Zoe Stapp
Brookdale Fruit Farm Inc.
38 Broad Street
Hollis NH 03049
z.c.stapp@gmail.com
603-465-2240 ex 3

Bill Wolfram
District Sales Manager
Toro Ag Business
Cell 757-710-0320
Customer Service
877-373-0087
Bill.Wolfram@toro.com