

MICRO-SPRINKLERS AND JETS



World Leader in Irrigation Technology

"I enjoy working with Jain Irrigation because of their quality products and excellent service. The Jain Jet has proven to be my go-to sprinkler because of the large selection of flow rates and spray patterns that match all my soil types."

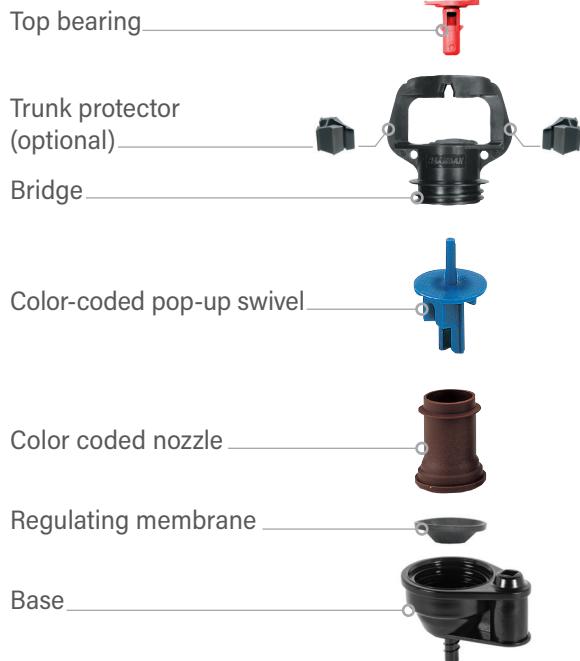
Marc Camino, Valley Wide Land Management
Del Rey, CA





2002 AquaSmart

Components



Standard Assembly



Product Features

- Retractable pop-up swivel to minimize insect and debris from entering the sprinkler between irrigation cycles
- Unique floating, self flushing, and pressure compensating EPDM diaphragm
- Color coded nozzles for easy identification of flow rate.
- Five swivels from Extra Long range to short Range to provide optimal coverage
- Removable tab on 2 stage deflector to provide increased diameter as trees mature
- Optional green swivel and spring loaded bridge for inverted installations
- Manufactured from the highest quality materials for long term field operations
- Superior resistance to clogging due to large water passages
- Highest uniformity for even distribution of water and fertilizers
- Less soil compaction and reduced runoff due to low application rates
- Multiple attachment options: quick thread, barbed, female, 3/8" thread
- Optional trunk protector to protect the plant trunk from wetting
- Easy to maintain with simple to replace parts
- New Diaphragm retention clip to prevent lost diaphragms during cleaning

Applications

- Orchards: almonds, walnuts, pecans, stone-fruit, and citrus
- Precision irrigation, cooling and frost control

Technical Data

- Flow rates: 5.3 gph to 25.1 gph
- Wetting diameters: 9.8' to 24.6' with standard swivel and 3.3' to 9.8' with 2 stage deflector
- Operating pressure: 20 to 60 psi (XL nozzles and swivel combinations 25 to 60 psi)
- Recommended filtration: 120 mesh

2002 AquaSmart



2002 AquaSmart Performance

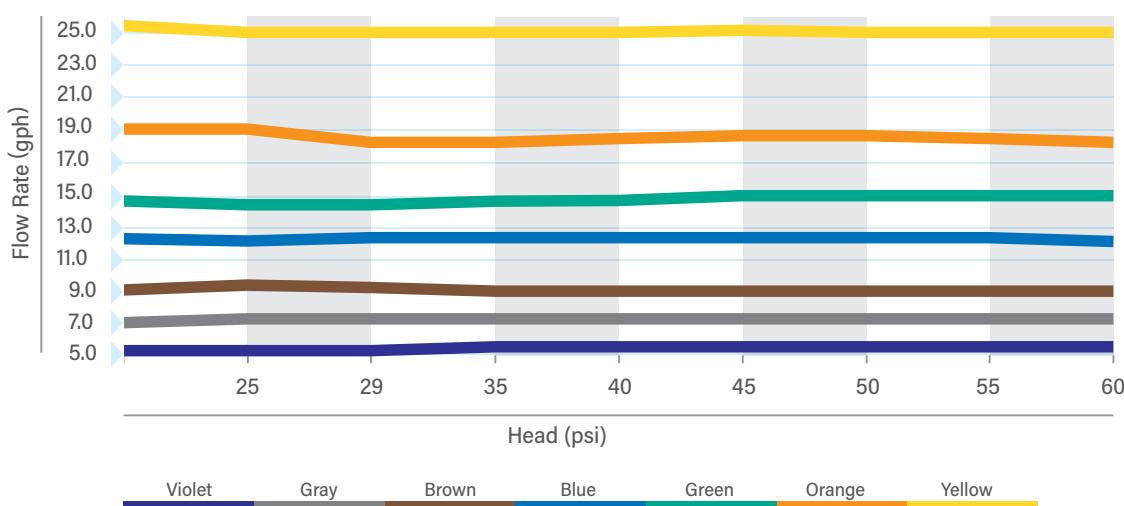
Nozzle Color	Nominal Flow (gph)	Nozzle Diameter (inches)	Swivels - Wetted Diameter (feet)							
			Orange		Black		Blue		Green	Red
			Short Range	Medium Range w/ Deflector	Medium Range	Long Range w/ Deflector	Long Range	Inverted	Extra Long Range w/ Deflector	Extra Long Range
Violet	5.3	0.033	9.8	4.9	11.5					
Gray	7.4	0.039	9.8	6.6	13.0	4.9	14.7	16.4		
Brown	9.3	0.043	11.5	8.2	13.0	6.6	16.4	16.4		
Blue	12.4	0.049	11.5	8.2	14.7	6.6	18.0	16.4		
Green	14.5	0.052	11.5	8.2	14.7	6.6	19.7	16.4		
Orange	18.5	0.058		8.2	16.4	8.2	23.0	16.4		
Yellow	25.1	0.069		9.8	18.0	9.8	24.6	16.4		
Red XL	9.3	0.037							3.3	23.0
Black XL	10.5	0.039							4.9	23.0
Ivory XL	12.4	0.043							6.6	23.0

*Upside Down w/ Spring - 24" above ground level

Flow rate and wetted diameter (feet) at 29 psi. Tested at 10" above ground

Flow vs. Pressure

Nozzle Color	Nominal Flow (gph)	Pressure (psi)									
		20	25	30	35	40	45	50	55	60	
Violet	5.3	5.2	5.2	5.3	5.4	5.5	5.5	5.6	5.5	5.5	
Gray	7.4	7.4	7.4	7.4	7.4	7.5	7.5	7.5	7.5	7.4	
Brown	9.3	9.1	9.3	9.2	9.1	9.1	9.1	9.1	9.1	9.1	
Blue	12.4	12.5	12.2	12.4	12.4	12.3	12.3	12.3	12.2	12.2	
Green	14.5	14.7	14.5	14.5	14.6	14.8	15.0	15.1	15.1	15.0	
Orange	18.5	19.1	18.9	18.4	18.5	18.6	18.7	18.7	18.6	18.5	
Yellow	25.1	25.3	25.0	25.0	25.0	25.1	25.3	25.1	25.0	25.0	
Red XL	9.3		8.6	9.0	8.8	8.8	8.7	8.8	8.9	8.9	
Black XL	10.5			10.1	10.7	9.9	10.0	10.4	10.5	10.7	
Ivory XL	12.4		12.2	12.4	12.0	12.3	12.6	13.0	13.0	13.1	



2005 AquaMaster



Product Features

- Retractable pop-up nozzle to minimize insect and debris from entering the sprinkler between irrigation cycles
- Color coded nozzles for easy identification of flow rate.
- Break away tab on two stage swivel to increase the wetted diameters from young to mature trees
- Optional green swivel and spring loaded bridge for inverted installations
- Manufactured from the highest quality materials for long term field operations
- Superior resistance to clogging due to large water passages
- Less soil compaction and reduced runoff due to low application rates
- Multiple attachment options: quick thread, female, 3/8" thread, and 1/2" thread
- Optional stream deflector to protect the plant trunk from wetting
- Consists of three components for ease of repair and maintenance

Applications

- Orchards: almonds, walnuts, pecans, stone-fruit, and citrus
- Ideal for greenhouse, nurseries, and open fields
- Enhances frost protection and cooling

Technical Data

- Flow rates: 9 to 79 gph (29 psi)
- Recommended working pressure: 20 to 35 psi
- Wetted diameter: 18' to 39.4'; 6.6' to 9.8' with deflector
- Required filtration: 120 mesh

2005 AquaMaster



2005 AquaMaster Performance

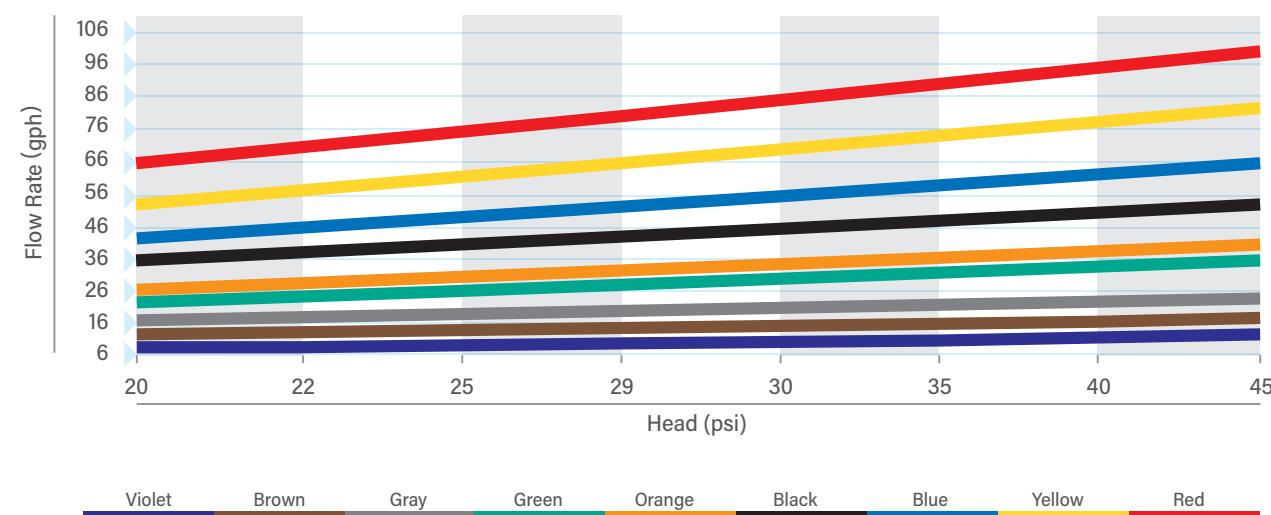
Nozzle Color	Nominal Flow (gph)	Nozzle Diameter (inches)	2006 Swivels - Wetted Diameter (feet)							
			Black		Blue		Gray		Green	Green
			Medium Range w/ Deflector	Medium Range	Long Range w/ Deflector	Long Range	Long Range w/ Deflector	Long Range	Extra Long Range	Inverted **
Violet	9	0.032	6.6	18.0						21.3
Brown	13	0.037	6.6	21.3						24.6
Gray	18	0.045			8.2	23.0				29.5
Green	28	0.055			9.8	27.9				32.8
Orange	32	0.059					6.6	18.0	29.5	34.4
Black	42	0.069					8.2	19.7	32.8	36.1
Blue	53	0.076					8.2	19.7	34.4	37.7
Yellow	66	0.085					9.8	19.7	36.1	
Red	79	0.093					9.8	23.0	39.4	

Flow rate and wetted diameter (feet) at 29 psi. Tested at 10" above ground. Green Inverted tested at 6' above ground.

**Green inverted swivel tested at 6 feet above ground

Flow vs. Pressure

Nozzle Color	Nominal Flow (gph)	Pressure (psi)					
		20	25	30	35	40	45
Violet	9	7.6	8.6	9.7	10.3	10.8	11.5
Brown	13	10.9	12.3	13.9	14.8	15.5	16.4
Gray	18	15.2	17.2	19.4	20.7	21.6	23.0
Green	28	22.8	25.8	29.1	31.0	32.5	34.5
Orange	32	26.1	29.5	33.3	35.4	37.1	39.5
Black	42	34.8	39.3	44.4	47.3	49.5	52.6
Blue	53	43.5	49.2	55.5	59.1	61.8	65.8
Yellow	66	54.4	61.5	69.4	73.8	77.3	82.2
Red	79	65.2	73.8	83.2	88.6	92.7	98.7



Jain Jets



Product Features

- Precision molding—ensures precise spray patterns
- Static, no moving parts
- Seven color coded flow rate nozzles for easy identification
- 18 Different wetting patterns to chose from for optimal water distribution
- Manufactured from the highest quality materials for long term field operations
- Fast and easy installation—quick thread technology
- Low maintenance
- Easy clog detection
- Top Hat available to use with young trees for reduced radius and higher application rates in root zones

Applications

- Orchards: almonds, walnuts, stone fruit
- Vineyards
- Organic or conventional fields

Technical Data

- Flow rates: 4.4 to 29.4 gph
- Recommended operating pressure: 10 to 30 psi
- Wetted diameter: 7' to 34'
- Filter requirement: 120 mesh

Jain Multi Stake



Support Stake

The Jain Jet support stake is perfect for field installation—designed with strength to penetrate the soil with ease.

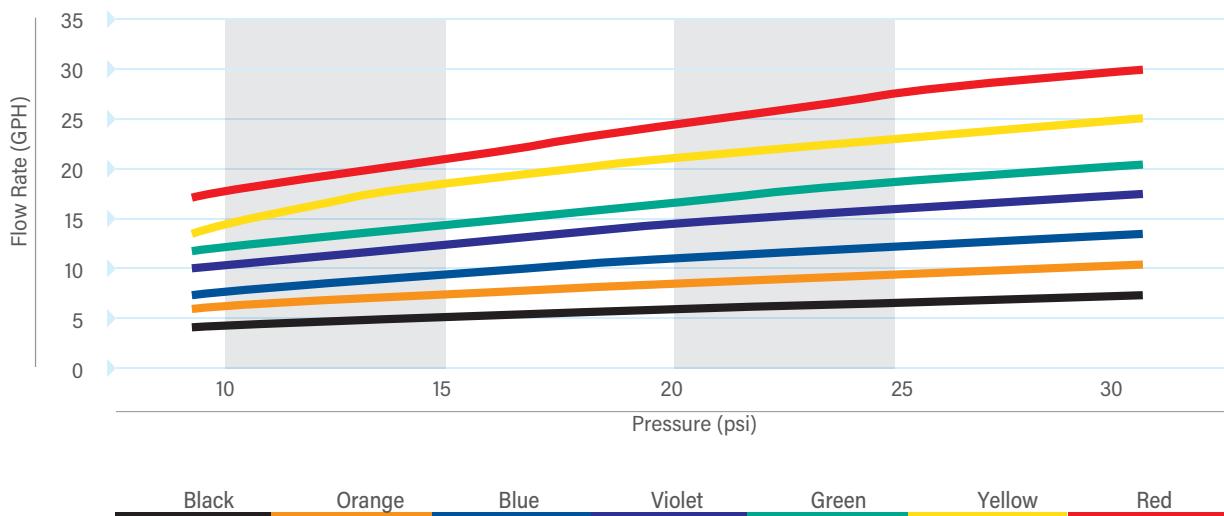
The top edge can be hammered down and allows the height of the jet to be adjusted. It is made with double support for easy tubing installation.



Jain Jet Performance

Nozzle Color	Flow Rate (gph at 20 psi)	K Factor	x Exponent	Cv Coefficient of Manufacturing
#30 Black	5.9	1.46	0.47	< 3%
#35 Orange	8.5	1.85	0.51	< 3%
#40 Blue	10.7	2.34	0.51	< 3%
#45 Violet	14.1	3.16	0.50	< 3%
#50 Green	16.7	3.74	0.50	< 3%
#55 Yellow	20.5	3.97	0.55	< 3%
#60 Red	24	5.40	0.50	< 3%

Jain Jet Flow vs. Pressure



Jain Jet Performance Data

Nozzle Size	Pressure (psi)	Flow (gph)	Diameter (feet)										
			A Pattern		B Pattern	B1 Pattern	C Pattern	D Pattern	E Pattern	F Pattern	G Pattern	H Pattern	J2 Pattern
			High Stream	Low Stream									
#30 Black	10	4.4	10	9	12	12	10	9	10	11	7	11	8
	15	5.2	12	10	14	16	11	10	11	13	8	13	9
	20	6	14	10	16	17	12	11	12	15	9	14	9
	25	6.7	14	11	17	18	13	12	13	17	10	15	10
	30	7.4	15	11	18	20	13	13	14	18	11	16	10
#35 Orange	10	5.9	14	10	15	14	13	10	11	14	8	13	9
	15	7.3	16	12	17	17	15	11	12	16	10	15	10
	20	8.4	17	13	18	18	16	12	14	18	12	16	11
	25	9.4	18	14	19	20	17	13	15	19	13	17	12
	30	10.3	19	15	20	21	18	14	16	20	14	18	12
#40 Blue	10	7.5	15	11	16	17	15	11	12	16	9	14	10
	15	9.3	17	13	18	18	17	12	13	19	11	16	11
	20	10.7	19	15	20	21	19	13	15	21	13	17	12
	25	12	21	17	22	22	20	14	16	23	14	18	13
	30	13.1	22	18	24	24	21	15	17	25	15	19	14
#45 Violet	10	10	17	13	17	18	18	11	14	18	11	15	12
	15	12.2	20	15	19	20	20	12	15	21	12	16	13
	20	14.1	22	17	21	22	22	14	17	23	14	18	14
	25	15.8	24	19	23	24	24	15	18	25	15	19	15
	30	17.3	26	21	25	26	25	16	19	27	16	20	15
#50 Green	10	11.8	20	14	18	19	19	-	14	19	-	-	14
	15	14.4	23	17	20	21	21	-	15	22	-	-	15
	20	16.7	25	19	22	24	22	-	17	25	-	-	16
	25	18.6	27	21	24	26	26	-	19	27	-	-	17
	30	20.4	29	23	26	28	28	-	21	29	-	-	18
#55 Yellow	10	13.7	21	15	-	21	22	-	15	20	-	-	-
	15	17.8	25	18	-	25	24	-	17	24	-	-	-
	20	20.5	27	20	-	27	27	-	19	27	-	-	-
	25	22.9	29	22	-	28	30	-	20	29	-	-	-
	30	25.1	31	24	-	29	32	-	22	32	-	-	-
#60 Red	10	17	22	16	-	22	24	-	16	21	-	-	-
	15	20.8	26	19	-	25	26	-	19	25	-	-	-
	20	24	28	22	-	28	29	-	21	29	-	-	-
	25	26.8	30	24	-	30	32	-	23	32	-	-	-
	30	29.4	32	27	-	31	34	-	25	34	-	-	-

* Diameters are approximate until verified by standardized testing

Jain Jet Performance Data

Nozzle Size	Pressure (psi)	Flow (gph)	Diameter (feet)															
			K Pattern		L Pattern		N Pattern		P Pattern		R Pattern		U Pattern		V Pattern		X Pattern	
			High Stream	Low Stream	Radius	Width	Length	Width	Radius	Width	Length	Width	Radius	Width	Length	Width		
#30 Black	10	4.4	7	4	10	9	7	13	10	5	12	5.5	8.5	11	5			
	15	5.2	8	4	12	10	7.5	14	11	5	13	6	9	13	6			
	20	6	8	4	14	10	8	15	13	6	14	7	11	15	7			
	25	6.7	8	4	14	11	8.5	15.5	14	6	15	8	11.5	16	8			
	30	7.4	8	4	15	11	9	16.5	15	7	16	8	12.5	17	8			
#35 Orange	10	5.9	8	4	14	10	8	15	12	6	14	7	10	14	7			
	15	7.3	8	4	16	12	8.5	15.5	14	6	15	7	11	16	8			
	20	8.4	8	4	17	13	9	16.5	15	7	17	8	11.5	19	8			
	25	9.4	8	4	18	14	9.5	17.5	16	7	18	8	12.5	21	9			
	30	10.3	8	5	19	15	10	18.5	17	8	19	9	13	23	9			
#40 Blue	10	7.5	8	4	15	11	8.5	15.5	13	7	15	7	11	14	8			
	15	9.3	8	4	17	13	9	16.5	14	8	17	8	11.5	17	9			
	20	10.7	8	5	19	15	10	18.5	16	9	19	8	12.5	19	9			
	25	12	8	5	21	17	11	20.5	17	9	20	9	13	20	10			
	30	13.1	9	5	22	18	12	22	19	10	21	9	14	22	11			
#45 Violet	10	10	9	5	17	13	9	16.5	14	8	17	8	11.5	16	9			
	15	12.2	9	5	20	15	10	18.5	15	9	19	8	12.5	19	11			
	20	14.1	9	5	22	17	11	20.5	17	10	22	9	14	22	12			
	25	15.8	9	6	24	19	12	22	18	11	23	10	14.5	24	13			
	30	17.3	9	6	26	21	13	24	20	12	25	10	15.5	26	14			
#50 Green	10	11.8	8	5	20	14	10	18.5	15	10	19	-	-	18	11			
	15	14.4	8	5	23	17	11	20.5	17	11	22	-	-	21	13			
	20	16.7	9	6	25	19	12	22	19	13	25	-	-	24	14			
	25	18.6	9	6	27	21	12.5	23	21	13	26	-	-	26	15			
	30	20.4	10	7	29	23	13	24	22	14	28	-	-	28	16			
#55 Yellow	10	13.7	9	5	21	15	-	-	16	13	20	-	-	18	11			
	15	17.8	9	6	25	18	-	-	19	15	23	-	-	22	14			
	20	20.5	9	7	27	20	-	-	21	17	26	-	-	25	15			
	25	22.9	10	7	29	22	-	-	23	18	28	-	-	27	17			
	30	25.1	11	8	31	24	-	-	26	19	30	-	-	29	17			
#60 Red	10	17	10	6	22	16	-	-	18	16	21	-	-	19	14			
	15	20.8	10	7	26	19	-	-	22	19	24	-	-	23	15			
	20	24	11	7	28	22	-	-	24	22	28	-	-	27	16			
	25	26.8	11	8	30	24	-	-	26	22	30	-	-	28	20			
	30	29.4	12	8	32	27	-	-	28	23	33	-	-	30	20			

* Diameters are approximate until verified by standardized testing

Smart Jet PC



Structure and Features

- Manufactured from the highest quality materials for long term durability
- Precision molded, ensuring precise patterns
- Color coded nozzles for easy identification of flow rates
- Wide pressure regulating range: 15 to 45 psi
- Utilizes Jain Multi Stake for flexible installations
- PC model maintains flow and enables using longer laterals
- Smart Cap is used to limit wetted area for irrigating young trees

Applications

- Precision irrigation, cooling, and frost protection
- For orchards, vineyards, citrus and landscape

Technical Data

- Recommended working pressure: 15–45 psi
- Flow rate: 5.0 to 14.5 gph
- Wetted diameter: 11' to 21'
- Filter requirements: 120 mesh

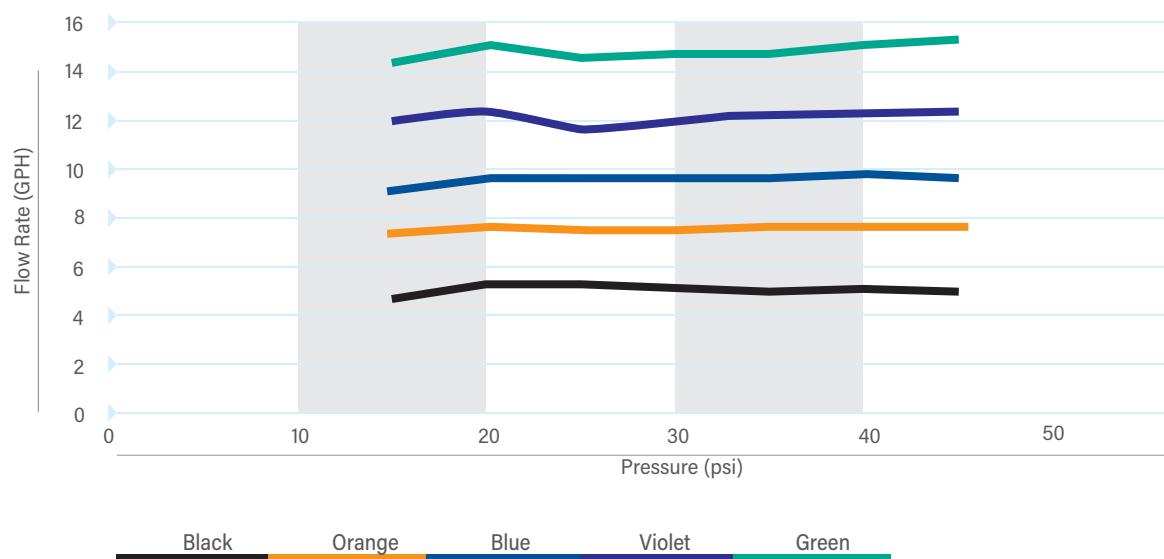


Smart Jet PC Performance

Nozzle Color	Outlet Diameter (inches)	Flow Rate (gph)	Pressure (psi)	Flow Rate and Wetted Diameter Approx. Diameter (feet)				
				A (High) Full Circle 12 jets	A (Low) Full Circle 12 jets	C 210° 8 jets	J Full Circle 16 jets	U 270° 10 jets
Black	0.033	5.0	20	16	14	16	11	13
Orange	0.041	7.4	20	17	14	17	13	16
Blue	0.045	9.2	20	17	15	19	15	18
Violet	0.049	12.1	20	18	16	19	15	18
Green	0.053	14.5	20	20	18	21	17	21W

Note: Wetted diameter tested at 10" above ground. Performance table prepared under laboratory conditions. Distance loss in Smart Jet IP models (compared to Smart Jet models) 10%.

Smart Jet PC Flow Rate vs. Pressure



Preventative Maintenance for Jets and Micro Sprinkler Systems

Regular Maintenance

A) ROUTINE MAINTENANCE—EVERY IRRIGATION

i) Filtration

(1) Automatic Filters

- (a) Verify flushing is occurring properly
- (b) Manual flush when system reaches operating pressure

(2) Manual Filters

- (a) Make sure filter element is clean before start-up
- (b) Make sure pressure differential on filter is within specification for system

ii) FlowMeter

(1) Verifies system flow rate every time you irrigate. Detects possible problems

(a) High flows

- (i) Verify the correct valve(s) are open/closed
- (ii) Possible broken lines

(b) Low flows

- (i) Verify the correct valves(s) are open/closed
- (ii) Possible plugged emitters/sprinklers

iii) Pressure gauges

(1) Verify system pressures every time you irrigate.

(a) High pressures

- (i) Verify the correct valve(s) are open/closed
- (ii) Possible plugged Filter
- (iii) Possible plugged emitters/sprinklers

(b) Low pressures

- (i) Verify the correct valve(s) are open/closed
- (ii) Possible broken lines

iv) Visual Inspections

(1) Filter Station

- a) Verify correct pressures and flow rates are maintained

(2) Valve Stations

- (a) Verify correct valves are open/closed
- (b) Verify correct pressures

(3) Field

- (a) Sprinklers are upright
- (b) Sprinklers are turning
- (c) No Geysers

B) SCHEDULED MAINTENANCE—WEEKLY, MONTHLY

i) Filtration

- (1) Visually inspect filter element (screen, disks, sand, etc.)
- (a) Verify filter element is clean, manually clean if needed
- (b) Check for wear on filter element

ii) Flushing

(1) PVC manifolds, sub mains, and mainlines

- (a) Consult designer for flush time

(2) Laterals (PVC or Polyethylene)

- (a) Rule of thumb is a velocity at 1fps.
 - (i) 600' lateral takes a minimum of 10 minutes to complete flushing
- (b) Consult designer for maximum lines to open at once to ensure adequate flush velocity

iii) Weed Control

(1) Routine mowing or spray

- (a) Weeds block rotating sprinklers and disturbs wetting pattern

- (b) Excessive vegetation provides a home for insects; insects can cause external sprinkler plugging due to nesting in the nozzles.

Preventative Maintenance

A) BEST MANAGEMENT PRACTICE IS PERFORMING SCHEDULED AND ROUTINE MAINTENANCE AS DESCRIBED ABOVE

i) Filtration

B) CHEMIGATION

i) Water Treatment

- (1) High mineral content- acids or phosphates can be used to prevent scaling, please consult with your PCA or CCA for recommendation

- (2) Organic matter- Biocides (Chlorine) can be used to prevent growth, please consult with your PCA or CCA for recommendation

C) FERTIGATION

i) Chemical compatibility—Jar test to ensure no precipitates.

- (1) Harsh chemicals that increases plugging and premature wear—Lime, gypsum, acids, surfactants, etc.

Micro Sprinkler and Jet Troubleshooting

Problem	Description	Possible Cause	Solutions
Swivel doesn't pop up (2002 and 2005)	Swivel stuck in down position while operating	1. Inlet pressure below specification	1. Check lateral/ system pressure
		2. Nozzle plugged	2. Check and follow routine and scheduled maintenance
		3. Interference by foreign matter	3. Remove swivel and free the debris
Swivel doesn't close (2002 and 2005)	Swivel remains in the upright position when system is shut down	1. Interference by foreign matter	1. Remove swivel and free the debris
		2. Excessive wear	2. Refer to excessive wear
Swivel not spinning (2002 and 2005)	Swivel stuck in down position while operating	1. Inlet pressure below specification	1. Check lateral/ system pressure
		2. Interference by foreign matter	2. Remove swivel and free the debris
		3. Plugging	3. Clean nozzle
		4. Excessive wear	4. Refer to excessive wear
Wide wetting pattern (2002 and 2005)	Non-uniformity due to sprinkler throwing too far	1. Excessive pressure	1. Check lateral/ system pressure
		2. No regulating diaphragm	2. Install new diaphragm
		3. Foreign matter in regulating chamber	3. Take sprinkler apart and clear debris
Narrow Pattern	Non-uniformity due to sprinkler not throwing far enough	1. Inlet pressure below specification	1. Check lateral/ system pressure
		2. Plugging	2. Clean nozzle
		3. Excessive wear	3. Refer to excessive wear
Misting	Excessive misting causing poor uniformity and high humidity	1. Excessive pressure	1. Check lateral/ system pressure
		2. No regulating diaphragm (2002 and Smart Jet PC)	2. Install new diaphragm
		3. Foreign matter in regulating chamber (2002 and Smart Jet PC)	3. Take sprinkler apart and clear debris
Excessive Wear	Component parts wearing out prematurely	1. Unfiltered water	1. Install proper filtration
		2. Injecting abrasive chemical	2. Perform Jar test for chemical precipitation
		3. Harsh chemicals	3. Check with PCA or CCA for compatibility with irrigation system
		4. Excessive use	4. System under designed
Excessive Dripping	Excessive water leaking from the head of the sprinkler	1. Improper assembly	1. Make sure sprinkler is properly assembled
		2. Damaged component-freezing, mechanical, pest, etc.	2. Inspect and replace broken components or replace sprinkler.
Plugging	No water coming out of the nozzle	1. Improper filtration	1. Refer to sprinkler filtration requirements
		2. Improper maintenance	2. Refer to maintenance guide
		3. Insect nesting	3. Clean nozzle, consider bug proof sprinkler "Eliminator"



Jain is a fully integrated global food / plant production company recognized by Harvard Business to be one of five global sustainability champions, the G-20 for lifting people out of poverty, and Fortune magazine for being a "Change the World Company". Our irrigation manufacturing capabilities include everything from behind the pump to the flush valve at the end of the lateral and everything in between. We lead the industry in manufacturing technology, owning both our extrusion and mold manufacturing equipment providers.

Jain leads plant science research globally across a variety of food crops and is staffed with some of the world's leading research scientists. With the Gandhi Library, Jain now houses the leading collection of the world's best plant science knowledge in a single facility. Our agronomic knowledge is integrated from our world class plant tissue culture operations through our food processing businesses. We research, educate, advance, manufacture, finance, propagate plants, and purchase produce for processing all in an effort to fulfill the Jain mission:

Jain Irrigation, Inc.

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Jain Customer Service

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"Leave This World Better Than You Found It"

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