



LDN



LDN -
(Low Drift Nozzle®)
True multiple
deflector pads for
consistent droplet size

Senninger®
Irrigation Inc.



LDN®

Wind drift and evaporation were major concerns for center pivot irrigators until the LDN. Introduced in 1990, the Senninger LDN® (Low Drift Nozzle) improved pivot irrigation as the first spray nozzle with multiple pads. Its streamlined body and durable components handle the rigors of traveling through tall crops. Like all Senninger products, the LDN is backed by two-year warranty on materials, workmanship and performance.

LDN Models

Senninger LDN utilizes grooves to direct water and control droplet size. The single pad divides the flow into 24 or 33 streams, and is ideal for smaller flows. As the flow and nozzle size increase along the length of the pivot, multiple deflector pads can be used to divide larger flows into more streams (66 and 99). This helps maintain a consistent droplet size throughout the distribution area. Applying that flow over a larger surface area reduces the application intensity and runoff.



Single: 33 Streams
0.24 - 5.24 gpm
[55 - 1190 L/hr]



Double: 66 Streams
3.91 - 9.54 gpm
[888 - 2167 L/hr]



Triple: 99 Streams
6.78 - 16.83 gpm
[1540 - 3823 L/hr]

Energy Savings - Low Pressure] LDN®



Senninger's LDN is designed for peak performance at low pressures- 6-20 psi [0.41-1.38 bar] operation,

making the most of the available water by getting it to the soil efficiently.

Lower pressure can translate into reduced horsepower requirements and less energy consumption offering irrigators a tremendous opportunity to lower total pumping costs and increase the bottom line.



Energy Savings Calculator

System Information	
Pump Flow	900 GPM
Pressure	60 Psi
Pumping Plant Efficiency	80 %
Hours of Operation per Year/Season	2000

Energy Type and cost	
Electricity	0.065 kWh/psi / Kwhour Cost \$ / Kwhour 0514
Diesel	12.5 WH/gal Cost \$ / gallon 2.542
Propane	6.89 WH/gal Cost \$ / 1000 Btu
Natural Gas	66.7 WH/1000 Btu Cost \$ / 1000 Btu

High / Low - Pressure Cost Comparisons	
Pressure	High pressure: 60 Psi, Low pressure: 30 Psi
Water Horsepower	High pressure: 27.99, Low pressure: 14.00
Brake Horsepower	High pressure: 34.99, Low pressure: 17.50
Water Pumped per Year/Season	High pressure: 294.61 acre-feet, Low pressure: 147.31 acre-feet
Seasonal Energy Cost of Water	High pressure: 14231.9, Low pressure: 7115.9

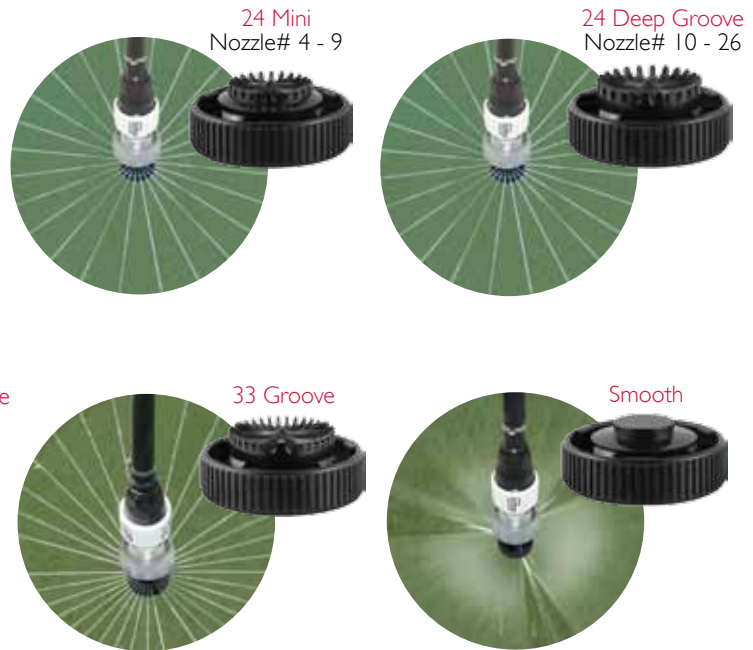
Annual / Seasonal Savings\$ 7115.96

Senninger has developed an interactive resource to help illustrate the cost savings of converting your system to low pressure. Define your current system flow and pressure, then indicate a lower pressure option under consideration. After inputting local rates for energy (electricity, diesel, propane or natural gas), the program automatically calculates the annual/seasonal savings possible.







Available online at www.senninger.com as a link in the Mechanized Irrigation section side bar.

LDN[®] [Pad Combinations

The surfaces of the LDN pads are specially designed to deliver different spray patterns and droplet sizes. Each surface is available in three basic geometries – flat, concave and convex – based on the desired trajectory of throw. Multiple pads are used to bind water into discreet streams that are resistant to wind drift and evaporation. As nozzle flow increases, small droplets are virtually eliminated sending more water to the root zone.



Pad Combinations

Nozzle number	Concave		Flat		Convex			
	Single	Stacked	Single	Stacked	Single	Stacked		
4 1/16" [1.59mm]								
5 5/64" [1.98mm]	cc-mini	cc-mini	fl-mini	fl-mini	cv-mini	cv-mini		
6 3/32" [2.38mm]								
7 7/64" [2.78mm]	CC	CC	FL	FL	CV	CV		
8 1/8" [3.18mm]								
9 9/64" [3.57mm]	CC	CC	FL	FL	CV	CV		
10 5/32" [3.97mm]								
11 11/64" [4.37mm]		CC-FL		CC-FL		FL-CV		
12 3/16" [4.76mm]								
13 13/64" [5.16mm]		CC-FL		CC-FL		FL-CV		
14 7/32" [5.56mm]								
15 15/64" [5.95mm]		CC-CC-FL		CC-FL-FL		FL-FL-CV		
16 1/4" [6.35mm]								
17 17/64" [6.75mm]		CC-CC-FL		CC-FL-FL		FL-FL-CV		
18 9/32" [7.14mm]								
19 19/64" [7.54mm]		CC-CC-FL		CC-FL-FL		FL-FL-CV		
20 5/16" [7.94mm]								
21 21/64" [8.33mm]		CC-CC-FL		CC-FL-FL		FL-FL-CV		
22 11/32" [8.73mm]								
23 23/64" [9.13mm]		CC-CC-FL		CC-FL-FL		FL-FL-CV		
24 3/8" [9.53mm]								
25 25/64" [9.92mm]		CC-CC-FL		CC-FL-FL				
26 13/32" [10.32mm]								
Nozzle to ground	1 ft. - 5 ft.		3 ft. - 7 ft.		6 ft. up			
Nozzle to nozzle	Minimum 150% Overlap							

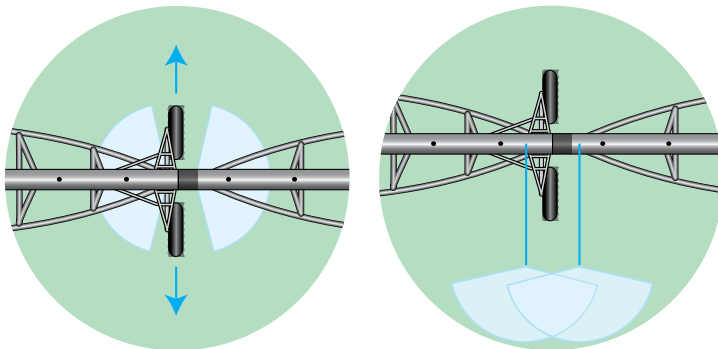
Part-Circle - Directional Pattern

The LDN Part-Circle pad is designed to help manage difficult-to-irrigate areas especially near towers. The LDN-PC distributes water away from wheel tracks and helps minimize rutting. With a 170-degree spray pattern, the LDN-PC binds water into 17 discreet streams at a 10-degree trajectory for minimum evaporative loss. It is available with nozzles #6 through #18 and can be used in conjunction with standard full circle LDNs or other Senninger sprinklers on the remainder of the machine. *(170 degree spray pattern can vary slightly based on flow and pressure.)*



Part-Circle - Distribution Pattern

The LDN Part-Circle distributes water away from wheel tracks to help minimize rutting. (for use on rigid drops.)



Hosebarb Adapter

With the LDN hosebarb adapter and drag hose water can be applied directly into the furrow. The adapter is easy to install, snapping right onto the LDN.



Base Options

The LDN is available with a 3/4" M NPT or with a 3/4" hose barb base for direct-to-hose connection.

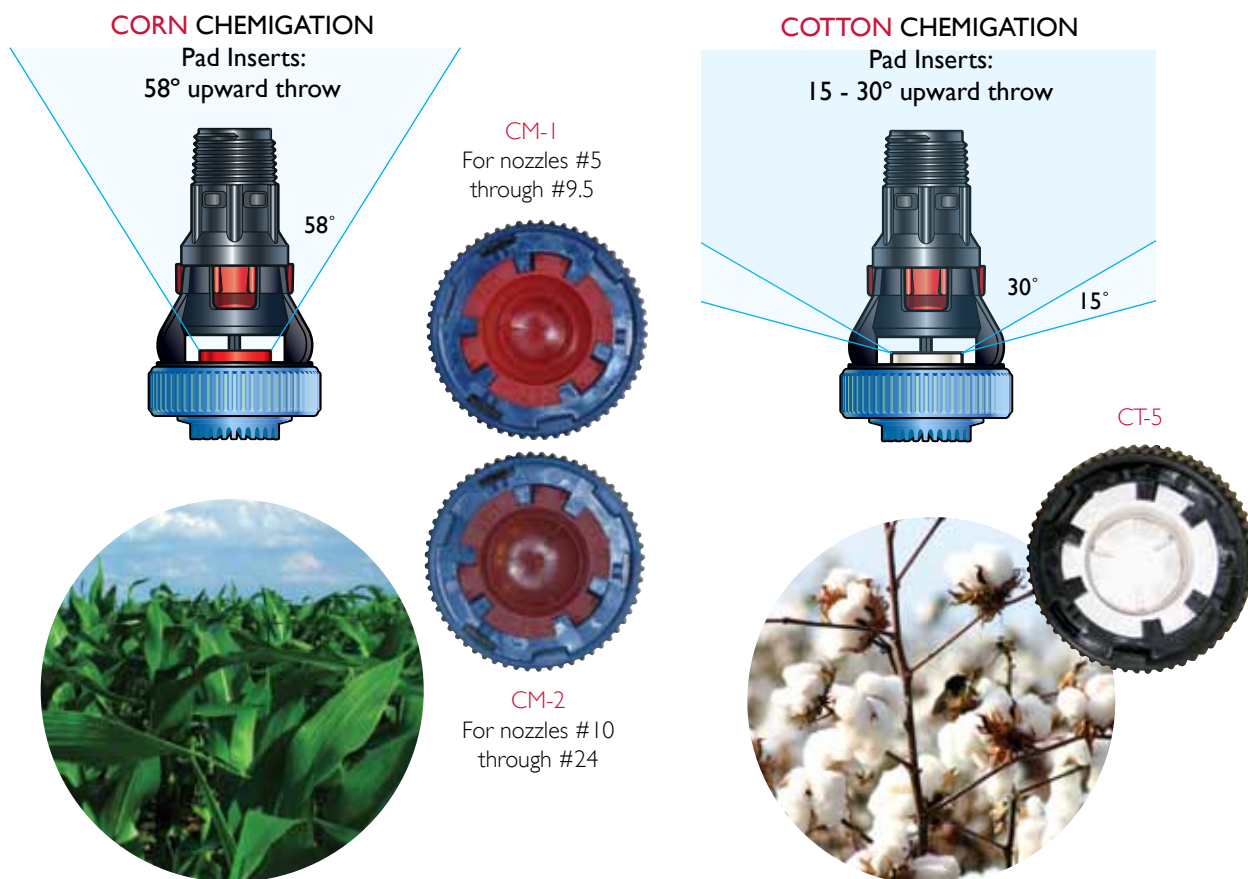
(Part-Circle model uses only NPT base and must be mounted on a rigid drop.)



LDN[®] [Chemigation & LEPA]

Chemigation Options

The LDN also offers chemigation pad inserts. These are designed to produce an upward spray under the crop canopy to wash the underside of a crop's leaves where pests hide eliminating or reducing the need for costly pesticides. To change from irrigation to chemigation mode, simply twist and unlock the deflector pad. Flip it over, and twist to lock it back in place. This allows a quick conversion, eliminating the need to carry additional parts in and out of the field.



Note: The LDN is not recommended for surface water or effluent applications.

Easy Change Pads

The LDN design makes it easy to change modes from irrigation to chemigation. Simply twist and unlock the deflector pad, flip it over, twist and lock it back on.



“The One” Weight

“The One” weight is all that is needed to provide stability on drops for a number of pivot applicators. The design includes unique “fit technology” that allows the weight to fit securely onto the i-Wob, LDN and the Super Spray and even some other manufacturer’s applicators.



The weight’s easy-to-install design allows it to remain on the applicator during nozzle changes. The aerodynamic design resists uplift forces of high wind.

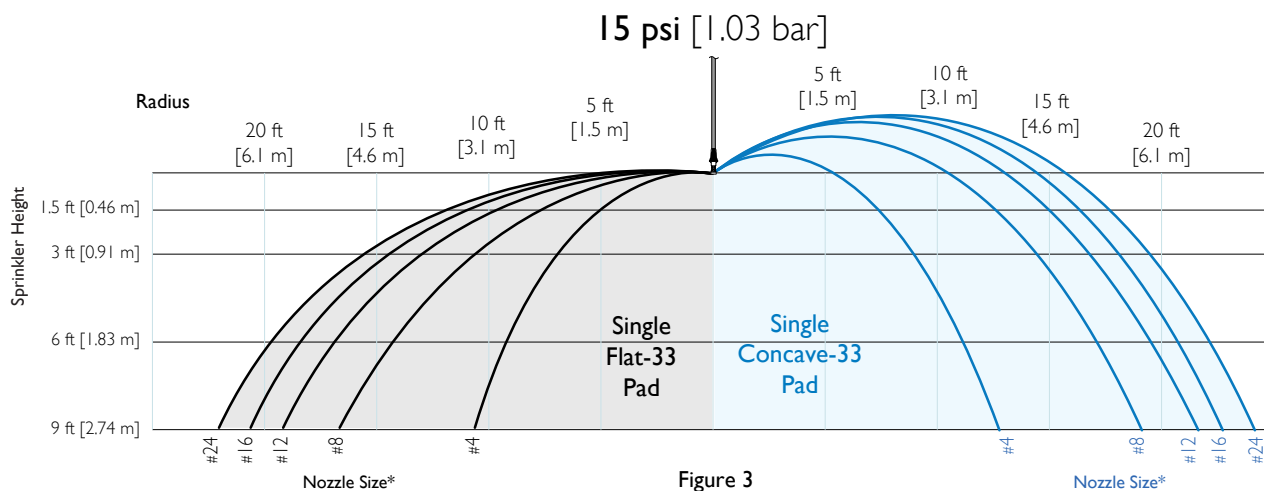
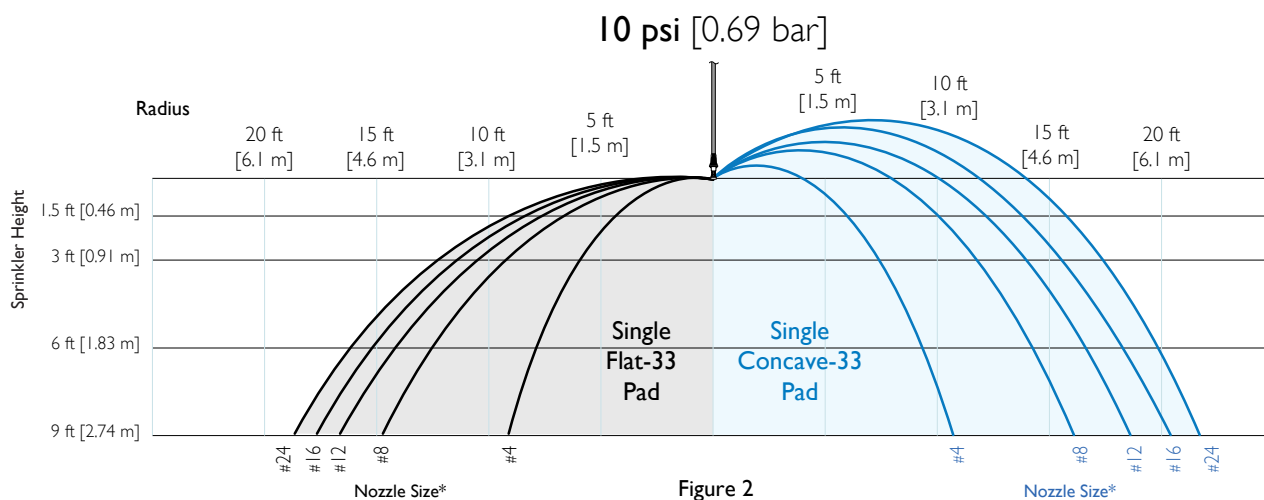
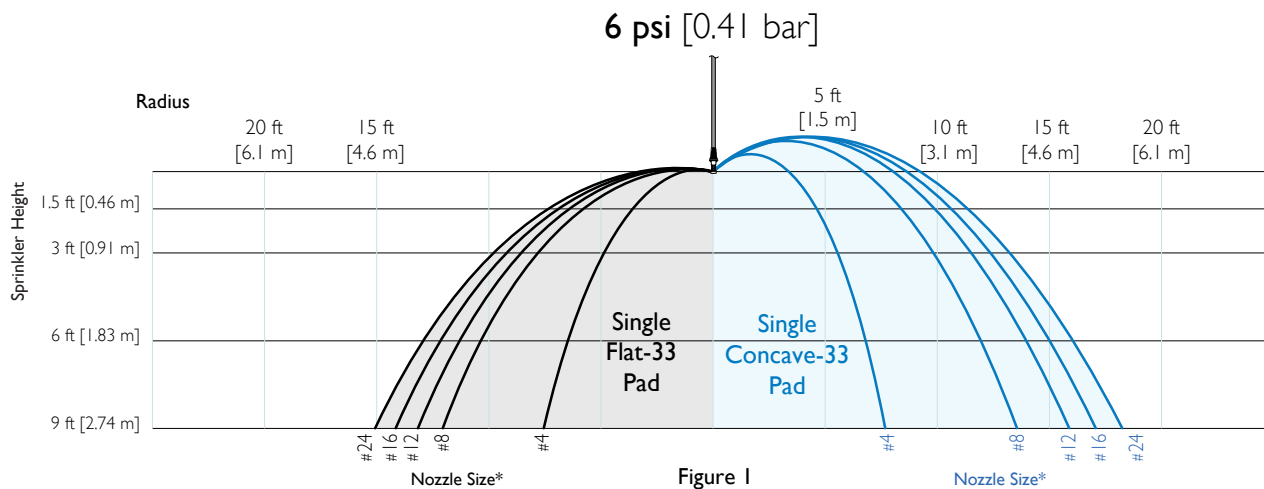
“The One” weight is constructed entirely of zinc alloy for strength and resistance to corrosion (0.85 lbs).

Direct Furrow (LEPA) Application

The LDN also offers a Bubbler insert pad for quick low-cost conversion to LEPA application. Discharging water very near the soil surface minimizes evaporation and eliminates wind-drift. When used in conjunction with the LDN weight, the bubbler insert gently deposits water directly into the furrow basins. This helps prevent erosion of rows. It is ideal to pre-water planted bare ground. This insert also keeps the crop canopy dry. When the LDN weight is not used the bubble ring is available to deliver a bubble pattern as well.



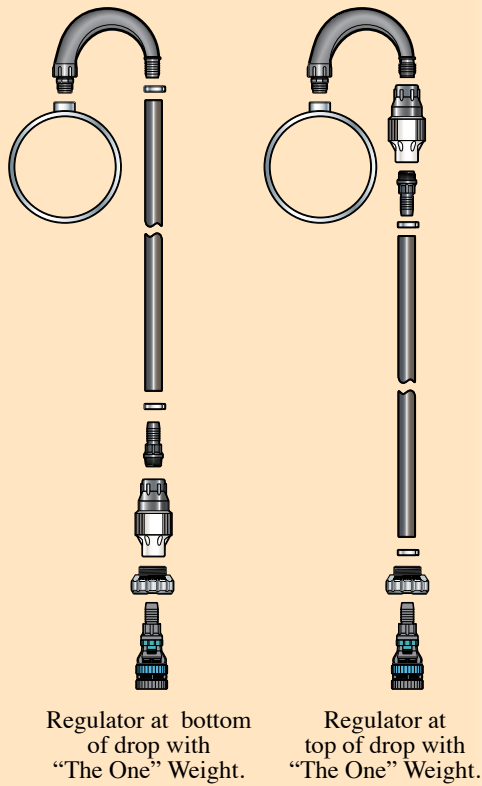
LDN[®] [Maximum Throw]



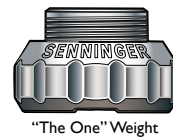
*Nozzle sizes are in 64ths of an inch. For example: #12 nozzle = $\frac{12}{64}$ inch = $\frac{3}{16}$ inch.

Flexible or Rigid Drop Installation

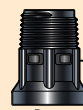
To maintain product warranty, and maximize drop component life, refer to the diagrams below...



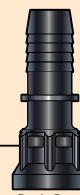
See Gooseneck Brochure for other installation options.



"The One" Weight



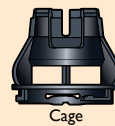
Base



Barb Base



Nozzle



Cage

Assembly Components



Single Pad



Part-Circle Pad (rigid drop only)

PAD INSERTS



Bubbler Pad



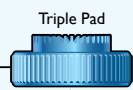
Chemigation Pad

Deflector Pads

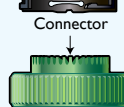
DEFLECTOR PAD OPTIONS



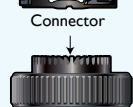
Double Pad



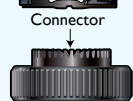
Triple Pad



Connector



Connector



Connector



Diameters [Nozzles #4-24]

LDN - 33 Groove Pad

SPRINKLER BASE PRESSURE							CONCAVE						FLAT			
[psi]	6	10	15	6	10	15	[bar]	0.41	0.69	1.03	0.41	0.69	1.03			
#4 Nozzle - Light Blue [1/16"]							#4 Nozzle - Light Blue [1.59mm]									
Flow [gpm]	0.24	0.35	0.37	0.24	0.35	0.37	Flow [L/hr]	55	79	84	55	79	84			
Diameter @ 1.5ft. ht. [ft.]	9.5	12.0	15.0	7.5	10.0	11.0	Diameter @ 0.46m ht. [m]	2.9	3.7	4.6	2.3	3.0	3.4			
Diameter @ 3ft. ht. [ft.]	11.5	15.0	18.0	10.0	13.0	15.0	Diameter @ 0.91m ht. [m]	3.5	4.6	5.5	3.0	4.0	4.6			
Diameter @ 6ft. ht. [ft.]	14.0	19.0	22.5	13.0	16.0	19.0	Diameter @ 1.83m ht. [m]	4.3	5.8	6.9	4.0	4.9	5.8			
Diameter @ 9ft. ht. [ft.]	15.5	21.5	25.5	15.0	18.0	21.0	Diameter @ 2.75m ht. [m]	4.7	6.6	7.8	4.6	5.5	6.4			
#8 Nozzle - Lavender [1/8"]							#8 Nozzle - Lavender [3.18mm]									
Flow [gpm]	1.12	1.45	1.73	1.12	1.45	1.73	Flow [L/hr]	254	329	393	254	329	393			
Diameter @ 1.5ft. ht. [ft.]	16.5	20.0	24.5	11.5	14.5	17.0	Diameter @ 0.46m ht. [m]	5.0	6.1	7.5	3.5	4.4	5.2			
Diameter @ 3ft. ht. [ft.]	20.0	24.0	29.0	16.0	20.0	23.5	Diameter @ 0.91m ht. [m]	6.1	7.3	8.8	4.9	6.1	7.2			
Diameter @ 6ft. ht. [ft.]	24.0	29.0	35.0	21.0	26.0	29.5	Diameter @ 1.83m ht. [m]	7.3	8.8	10.7	6.4	7.9	9.0			
Diameter @ 9ft. ht. [ft.]	27.0	32.5	38.0	24.0	29.0	33.0	Diameter @ 2.75m ht. [m]	8.2	9.9	11.6	7.3	8.8	10.1			
#12 Nozzle - Red [3/16"]							#12 Nozzle - Red [4.76mm]									
Flow [gpm]	2.45	3.16	3.81	2.45	3.16	3.81	Flow [L/hr]	556	718	865	556	718	865			
Diameter @ 1.5ft. ht. [ft.]	19.5	24.0	29.5	13.5	16.0	21.0	Diameter @ 0.46m ht. [m]	5.9	7.3	9.0	4.1	4.9	6.4			
Diameter @ 3ft. ht. [ft.]	23.5	28.5	34.0	18.0	22.5	27.5	Diameter @ 0.91m ht. [m]	7.2	8.7	10.4	5.5	6.9	8.4			
Diameter @ 6ft. ht. [ft.]	28.5	34.0	39.5	23.0	29.0	34.0	Diameter @ 1.83m ht. [m]	8.7	10.4	12.0	7.0	8.8	10.4			
Diameter @ 9ft. ht. [ft.]	31.5	37.5	43.0	26.0	33.0	38.0	Diameter @ 2.75m ht. [m]	9.6	11.4	13.1	7.9	10.1	11.6			
#16 Nozzle - Orange [1/4"]							#16 Nozzle - Orange [6.35mm]									
Flow [gpm]	4.48	5.79	6.91	4.48	5.79	6.91	Flow [L/hr]	1018	1315	1569	1018	1315	1569			
Diameter @ 1.5ft. ht. [ft.]	21.5	28.0	32.0	14.0	19.0	23.0	Diameter @ 0.46m ht. [m]	6.6	8.5	9.8	4.3	5.8	7.0			
Diameter @ 3ft. ht. [ft.]	25.5	32.0	37.0	19.0	24.5	29.5	Diameter @ 0.91m ht. [m]	7.8	9.8	11.3	5.8	7.5	9.0			
Diameter @ 6ft. ht. [ft.]	30.5	37.5	42.0	24.5	31.0	36.5	Diameter @ 1.83m ht. [m]	9.3	11.4	12.8	7.5	9.4	11.1			
Diameter @ 9ft. ht. [ft.]	34.0	41.0	45.0	28.0	35.0	41.0	Diameter @ 2.75m ht. [m]	10.4	12.5	13.7	8.5	10.7	12.5			
#20 Nozzle - Dark Turquoise [5/16"]							#20 Nozzle - Dark Turquoise [7.94mm]									
Flow [gpm]	6.78	8.75	10.44	6.78	8.75	10.44	Flow [L/hr]	1540	1987	2371	1540	1987	2371			
Diameter @ 1.5ft. ht. [ft.]	22.3	29.5	33.8	15.0	19.5	24.5	Diameter @ 0.46m ht. [m]	6.8	9.0	10.3	4.6	5.9	7.5			
Diameter @ 3ft. ht. [ft.]	26.3	33.5	38.5	19.8	25.3	30.8	Diameter @ 0.91m ht. [m]	8.0	10.2	11.7	6.0	7.7	9.4			
Diameter @ 6ft. ht. [ft.]	31.5	38.8	43.5	25.3	32.0	37.8	Diameter @ 1.83m ht. [m]	9.6	11.8	13.3	7.7	9.8	11.5			
Diameter @ 9ft. ht. [ft.]	35.0	42.0	46.0	29.0	36.0	42.5	Diameter @ 2.75m ht. [m]	10.7	12.8	14.0	8.8	11.0	13.0			
#24 Nozzle - Dark Blue [3/8"]							#24 Nozzle - Dark Blue [9.53mm]									
Flow [gpm]	9.34	12.06	14.4	9.34	12.06	14.4	Flow [L/hr]	2121	2739	3271	2121	2739	3271			
Diameter @ 1.5ft. ht. [ft.]	23.0	31.0	35.5	16.0	20.0	26.0	Diameter @ 0.46m ht. [m]	7.0	9.4	10.8	4.9	6.1	7.9			
Diameter @ 3ft. ht. [ft.]	27.0	35.0	40.0	20.5	26.0	32.0	Diameter @ 0.91m ht. [m]	8.2	10.7	12.2	6.2	7.9	9.8			
Diameter @ 6ft. ht. [ft.]	32.5	40.0	45.0	26.0	33.0	39.0	Diameter @ 1.83m ht. [m]	9.9	12.2	13.7	7.9	10.1	11.9			
Diameter @ 9ft. ht. [ft.]	36.0	43.0	47.0	30.0	37.0	44.0	Diameter @ 2.75m ht. [m]	11.0	13.1	14.3	9.1	11.3	13.4			

Nozzles #4-26] Flows

SPRINKLER BASE PRESSURE [psi]				[bar]			
	6	10	15		0.41	0.69	1.03
#4 Nozzle - Light Blue [1/16"]				#4 Nozzle - Light Blue [1.59mm]			
Flow [gpm]	0.24	0.35	0.37	Flow [L/hr]	55	79	84
#5 Nozzle - Beige [5/64"]				#5 Nozzle - Beige [1.98mm]			
Flow [gpm]	0.43	0.55	0.66	Flow [L/hr]	98	125	150
#6 Nozzle - Gold [3/32"]				#6 Nozzle - Gold [2.83mm]			
Flow [gpm]	0.64	0.82	0.98	Flow [L/hr]	145	186	223
#7 Nozzle - Lime [7/64"]				#7 Nozzle - Lime [2.78mm]			
Flow [gpm]	0.87	1.12	1.34	Flow [L/hr]	198	254	304
#8 Nozzle - Lavender [1/8"]				#8 Nozzle - Lavender [3.18mm]			
Flow [gpm]	1.12	1.45	1.73	Flow [L/hr]	254	329	393
#9 Nozzle - Grey [9/64"]				#9 Nozzle - Grey [3.57mm]			
Flow [gpm]	1.41	1.82	2.17	Flow [L/hr]	320	413	493
#10 Nozzle - Turquoise [5/32"]				#10 Nozzle - Turquoise [3.97mm]			
Flow [gpm]	1.74	2.25	2.96	Flow [L/hr]	395	511	672
#11 Nozzle - Yellow [1 1/64"]				#11 Nozzle - Yellow [4.37mm]			
Flow [gpm]	2.05	2.65	3.21	Flow [L/hr]	466	602	729
#12 Nozzle - Red [3/16"]				#12 Nozzle - Red [4.76mm]			
Flow [gpm]	2.45	3.16	3.81	Flow [L/hr]	556	718	865
#13 Nozzle - White [13/64"]				#13 Nozzle - White [5.16mm]			
Flow [gpm]	2.92	3.77	4.50	Flow [L/hr]	663	856	1022
#14 Nozzle - Blue [7/32"]				#14 Nozzle - Blue [5.56mm]			
Flow [gpm]	3.40	4.39	5.24	Flow [L/hr]	772	997	1190
#15 Nozzle - Dark Brown [15/64"]				#15 Nozzle - Dark Brown [5.95mm]			
Flow [gpm]	3.91	5.05	6.03	Flow [L/hr]	888	1147	1370
#16 Nozzle - Orange [1/4"]				#16 Nozzle - Orange [6.35mm]			
Flow [gpm]	4.48	5.79	6.91	Flow [L/hr]	1018	1315	1569
#17 Nozzle - Dark Green [17/64"]				#17 Nozzle - Dark Green [6.75mm]			
Flow [gpm]	5.03	6.50	7.76	Flow [L/hr]	1142	1476	1762
#18 Nozzle - Purple [9/32"]				#18 Nozzle - Purple [7.14mm]			
Flow [gpm]	5.62	7.25	8.65	Flow [L/hr]	1276	1647	1965
#19 Nozzle - Black [19/64"]				#19 Nozzle - Black [7.54mm]			
Flow [gpm]	6.19	7.99	9.54	Flow [L/hr]	1406	1815	2167
#20 Nozzle - Dark Turquoise [5/16"]				#20 Nozzle - Dark Turquoise [7.94mm]			
Flow [gpm]	6.78	8.75	10.44	Flow [L/hr]	1540	1987	2371
#21 Nozzle - Mustard [21/64"]				#21 Nozzle - Mustard [8.33mm]			
Flow [gpm]	7.37	9.52	11.36	Flow [L/hr]	1674	2162	2580
#22 Nozzle - Maroon [1 1/32"]				#22 Nozzle - Maroon [8.73mm]			
Flow [gpm]	7.97	10.29	12.28	Flow [L/hr]	1810	2337	2789
#23 Nozzle - Cream [23/64"]				#23 Nozzle - Cream [9.13mm]			
Flow [gpm]	8.86	11.18	13.34	Flow [L/hr]	2012	2539	3030
#24 Nozzle - Dark Blue [3/8"]				#24 Nozzle - Dark Blue [9.53mm]			
Flow [gpm]	9.34	12.06	14.4	Flow [L/hr]	2121	2739	3271
#25 Nozzle - Copper [25/64"]				#25 Nozzle - Copper [9.92mm]			
Flow [gpm]	9.82	13.04	15.56	Flow [L/hr]	2230	2962	3534
#26 Nozzle - Bronze [13/32"]				#26 Nozzle - Bronze [10.32mm]			
Flow [gpm]	10.3	14.1	16.83	Flow [L/hr]	2339	3202	3823



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