CHAPIN DRIP TAPE

World Leader in Irrigation Technology

JAIN

"The Chapin Drip Tape has a great wetting pattern for all our soil types. The durability and strength make it a great option for our farming operation!"

Nick Gomeza, Farm Manager
Gomeza Farms, Payette, ID

Growers are increasingly challenged to deliver high quality, uniform crops, while obtaining the greatest return on investments in water, labor, management and materials. Chapin Tape has helped lead the way to achieve these goals.

Chapin Tape leads the industry in providing the largest flow path, best Cv's and greatest strength in any wall thickness of tape. As the pioneer in drip irrigation, with 50 years experience making the highest quality drip irrigation tape, Chapin has the largest selection of flow rates, wall thicknesses and inlet filtration options available today. The extraordinary reliability and performance of Chapin Tape is attested to by long term Chapin Tape users world-wide.

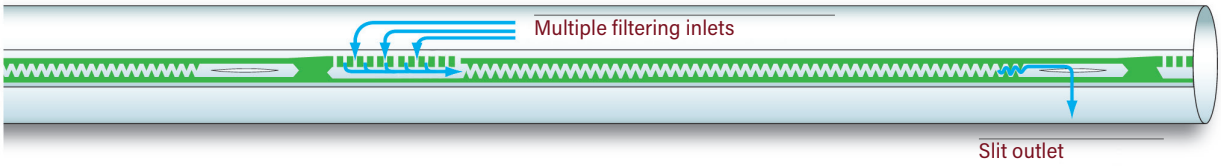
Product Features

- **Largest selection of flow rates on the market** from 0.20 gpm/100 feet to 1.8 gpm/100 feet—allowing the grower to utilize the precise amount of water for every application
- **Largest selection of wall thickness on the market** from 4 mil to 25 mil—allowing the grower to select the durability level they need for their toughest growing environment
- **Exceptional Run Length.** 7/8" Chapin drip tape will cover 1/4 mile run lengths while maintaining high emission uniformity—saving installation time and money by reducing the number of submains to properly deliver water
- **Best engineered flow path design.** Larger internal dimensions in the flow path provide extraordinary resistance to clogging
- **Unmatched uniformity**—Chapin Tape consistently supplies the lowest manufacturer's variations (Cv) in the industry
- **Make the right choice for your water conditions**—BTF model features multiple inlet filters. Deluxe models feature continuous inlet filtration for superior resistance to clogging
- **Engineered extruded profile**—extra thickness where it counts. Special cast extruded film pattern with rounded sides and more material on the edges reduces insect damage, mechanical abrasion and over pressurization
- **Unmatched variety of fittings and accessories**—Jain offers the complete tape irrigation system
- **Easier to retrieve from field upon season completion** due to cast extruded profile

Basic Turbulent Flow—BTF

Specifications

- Multiple inlet orifices ensure a continuous water flow to each dripper
- Turbulent flow path design provides larger internal dimensions offering higher resistance to clogging
- Largest selection of flow rates
- Available in 5/8" and 7/8" diameters
- Available wall thickness 4, 5, 6, 8, 10, 13, and 15 mil
- Engineered extruded high quality polyethylene film ensures round sides providing higher resistance to insect bites and field abrasion
- Slit design outlet will help prevent root intrusion and soil ingestion
- Longer flow path ensures true drip flow—no squirts
- A low emitter exponent will ensure less flow and pressure variation on steep slopes to help increase emission uniformity
- Lower winding tension to ensure less retraction in the field and avoid kinking and snaking during installation
- Stringent quality checks at every stage of production will help ensure a high quality product
- Reinforced packaging to ensure smooth handling in the field and during transportation



BTF Specifications and Ordering Guide

Chapin 5/8" BTF Specifications

Mil	Coils Per Pallet	Coil Length (feet)	Coil Weight (lbs)	Recommended Operating Pressure (PSI)	Maximum Operating Pressure (PSI)	Maximum Flushing Pressure (PSI)
4	12	13,000	67	6	12	12
5	12	12,000	70	10	13	13
6	16	10,000	68	10	14	14
8	16	7,500	68	10	18	18
10	16	6,000	65	10	23	23
12	16	4,500	63	10	25	25
15	16	4,000	63	10	35	35

Filtration Requirements: 0.30 gpm/100 feet (223 lph/100m) or less: 200 mesh
0.40 gpm/100 feet (298 lph/100m) or more: 150 mesh

BTF Specifications and Ordering Guide

Chapin 7/8" BTF Specifications

Mil	Coils Per Pallet	Coil Length (feet)	Coil Weight (lbs)	Recommended Operating Pressure (PSI)	Maximum Operating Pressure (PSI)	Maximum Flushing Pressure (PSI)
6	16	7,500	63	10	12	12
8	16	5,500	60	10	16	16
10	16	4,500	63	10	23	23
13	16	3,500	60	10	28	28
15	16	3,000	57	10	36	36

Filtration Requirements: 0.30 gpm/100 feet (223 lph/100m) or less: 200 mesh
0.40 gpm/100 feet (298 lph/100m) or more: 150 mesh

Chapin BTF Spacing and Flow Rates

Chapin	Size	Wall Thickness	Spacing	Flow Rates at 6 PSI	Flow Rates at 8 PSI	Flow Rates at 10 PSI	Length (100s ft.)	
			Inch	gpm/100ft	gpm/100ft	gpm/100ft	5/8"	7/8"
BTF	5/8" (06)	04	08	0.40	-	-	130	-
				0.50	-	-		
				0.65	-	-		
			12	0.25	-	-		
				0.30	-	-		
				0.40	-	-		
				0.50	-	-		
BTF	"5/8"" (06)	05	4		0.80	1.00	120	-
					1.06	1.33		
		06			1.44	1.80	100	075
			6		0.40	0.50		
					0.52	0.65		
		07			0.68	0.85	084	065
					1.06	1.33		
		08	8		0.32	0.40	075	055
					0.40	0.50		
					0.52	0.65		
					0.68	0.85		
	7/8"" (09)"	10			1.20	1.50	060	045
			12		0.20	0.25		
					0.24	0.30		
		13			0.32	0.40	050	035
					0.40	0.50		
					0.52	0.65		
		15			0.80	1.00	040	030
			16		0.16	0.20		

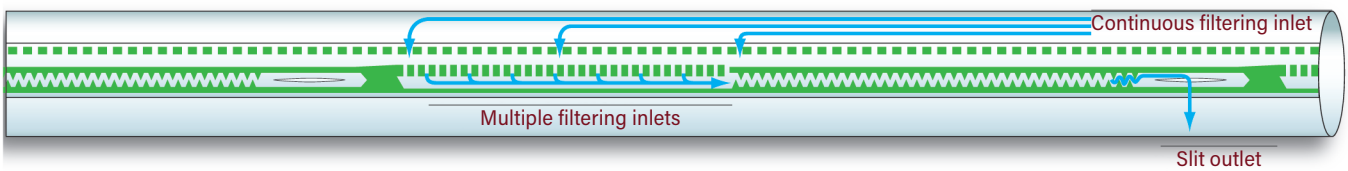
Turbulent Flow—Deluxe

Top Product Feature

- Due to extruded profile, it is easier to retrieve from the field once the season is completed

Specifications

- Exclusive continuous filtration channel keeps the debris away from the flow path and allows it to purge by flushing, ensuring high performance and extends the life of the tape
- Turbulent flow path design provides larger internal dimensions offering higher resistance to clogging
- Exclusive continuous inlet filter (10,000 filters per 100 feet) channel offers extremely high resistance to clogging
- Multiple inlet orifices ensure continuous water flow to each dripper
- Slit design outlet will help prevent root intrusion and soil ingestion
- Largest selection of Flow rates
- Available in 5/8" and 7/8" diameters
- Available wall thicknesses 5, 6, 8, 10, 12, 13, 15 mil
- Engineered extruded high quality polyethylene film ensures round sides providing higher resistance to insect bites and field abrasion
- Longer flow path ensures true drip flow—no squirts
- A low emitter exponent will reduce the variation in flow as the pressure increases on steep slopes
- Stringent quality checks at every stage of production and for each coil ensure a high quality product
- Reinforced packaging to ensure smooth handling in the field and during transportation



Deluxe Specifications and Ordering Guide

Chapin 5/8" Deluxe Specifications

Mil	Coils Per Pallet	Coil Length (feet)	Coil Weight (lbs)	Recommended Operating Pressure (PSI)	Maximum Operating Pressure (PSI)	Maximum Flushing Pressure (PSI)
6	12	10,000	77	10	14	14
8	12	7,500	73	10	18	18
10	12	6,000	69	10	23	23
13	12	5,000	68	10	25	25
15	12	4,000	68	10	35	35

Filtration Requirements: 0.30 gpm/100 feet (223 lph/100m) or less: 200 mesh
0.40 gpm/100 feet (298 lph/100m) or more: 120 mesh

Chapin 7/8" Deluxe Specifications

Mil	Coils Per Pallet	Coil Length (feet)	Coil Weight (lbs)	Recommended Operating Pressure (PSI)	Maximum Operating Pressure (PSI)	Maximum Flushing Pressure (PSI)
5	12	9,000	66	10	12	12
6	12	7,500	56	10	12	12
8	12	5,500	54	10	16	16
10	12	4,500	54	10	23	23
13	12	3,500	53	10	28	28
15	12	3,000	53	10	36	36

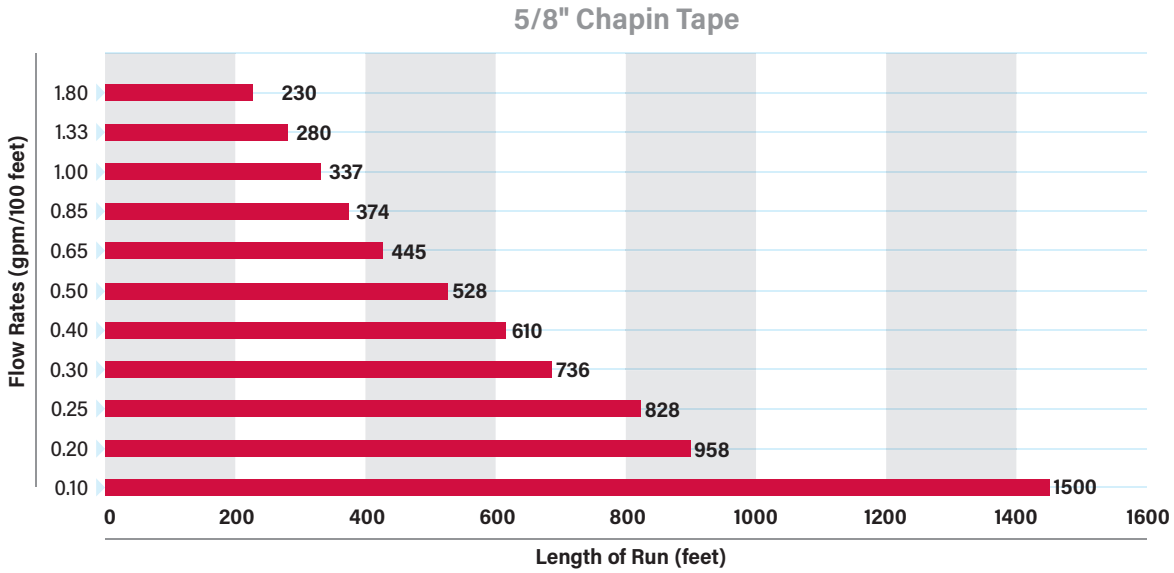
Filtration Requirements: 0.30 gpm/100 feet (223 lph/100m) or less: 200 mesh
0.40 gpm/100 feet (298 lph/100m) or more: 120 mesh

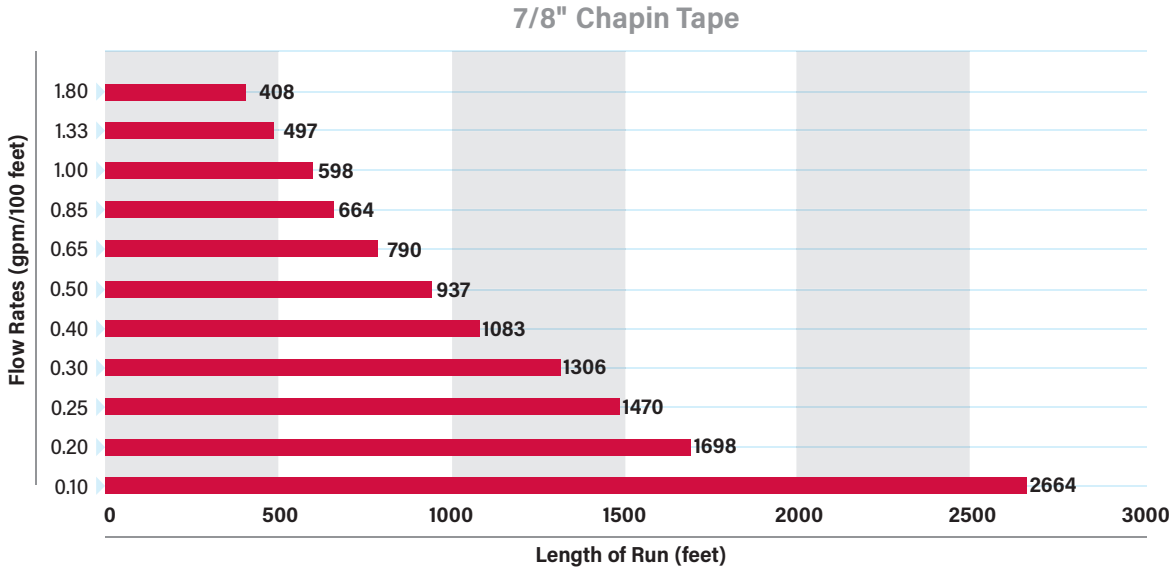
Deluxe Specifications and Ordering Guide

Chapin DLX Spacing and Flow Rates

Chapin	Size	Wall Thickness	Spacing	Flow Rates at 6 PSI	Flow Rates at 8 PSI	Flow Rates at 10 PSI	Length (100s ft.)	
			Inch	gpm/100ft	gpm/100ft	gpm/100ft	5/8"	7/8"
DLX	5/8" (06) 7/8" (09)"	05	2		1.60	2.00	120	–
			4		0.80	1.00		
					1.06	1.33		
					1.44	1.80		
		06	6		0.24	0.30	100	075
					0.32	0.40		
					0.40	0.50		
					0.80	1.00		
		07			1.06	1.33	084	065
			8		0.32	0.40		
					0.40	0.50		
					0.52	0.65		
		08			0.68	0.85	075	055
					1.20	1.50		
			12		0.20	0.25		
					0.24	0.30		
		10			0.32	0.40	060	045
					0.40	0.50		
					0.52	0.65		
					0.80	1.00		
		13			1.20	1.50	050	035
			16		0.16	0.20		
					0.32	0.40		
					0.40	0.50		
		15	18		0.40	0.50	040	030
			24		0.12	0.15		
					0.16	0.20		
					0.24	0.30		
					0.40	0.50		

Maximum Length of Run for 90% Uniformity—0% Slope





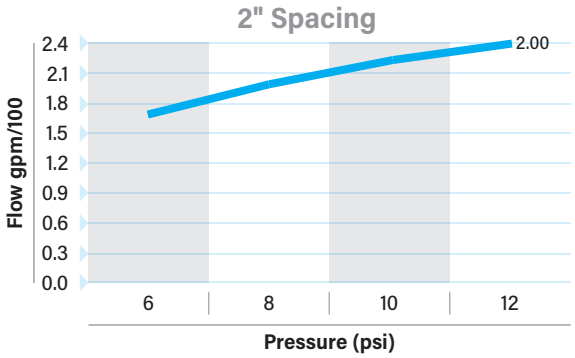
For more Run Length Options, please use our Run Length Calculator at www.jainsusa.com

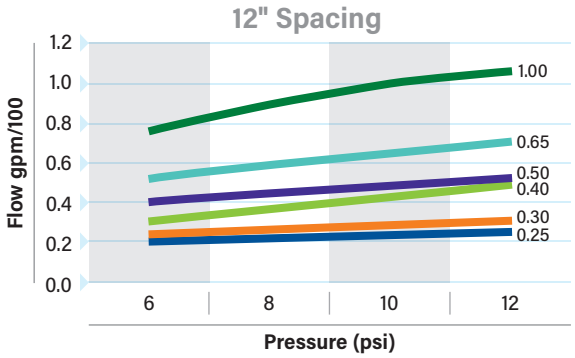
Spacing and Flow Rates

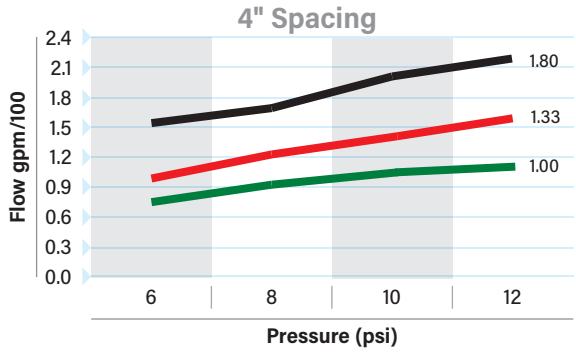
Chapin		Spacing		Outlets/ 100 ft	Flow Rates at 10 PSI				Flow Rates at 8 PSI				CV	K	X
		inch	cms		gpm/ 100ft	lph/ 100m	gph/ outlet	lph/ outlet	gpm/ 100ft	lph/ 100m	gph/ outlet	lph/ outlet			
-	DLX	2	5	600	2.00	1,488	0.20	0.76	1.60	1,190	0.16	0.60	1.79	0.073	0.42
BTF	DLX	4	10	300	1.00	744	0.20	0.76	0.80	595	0.16	0.60	2.40	0.070	0.53
BTF	DLX	4	10	300	1.33	989	0.27	1.01	1.06	792	0.21	0.80	1.30	0.083	0.47
BTF	DLX	4	10	300	1.80	1,339	0.36	1.36	1.44	1,071	0.29	1.09	2.50	0.001	0.54
-	DLX	6	15	200	0.30	223	0.09	0.34	0.24	179	0.07	0.27	3.50	0.032	0.53
-	DLX	6	15	200	0.40	298	0.12	0.45	0.32	238	0.10	0.36	2.04	0.030	0.61
BTF	DLX	6	15	200	0.50	372	0.15	0.57	0.40	298	0.12	0.45	3.40	0.052	0.47
BTF	-	6	15	200	0.65	484	0.20	0.74	0.52	387	0.16	0.59	3.00	0.071	0.47
BTF	-	6	15	200	0.85	632	0.26	0.96	0.68	506	0.20	0.77	1.72	0.090	0.42
-	DLX	6	15	200	1.00	744	0.30	1.13	0.80	595	0.24	0.91	4.40	0.017	0.49
BTF	DLX	6	15	200	1.33	989	0.40	1.51	1.06	792	0.32	1.21	2.00	0.117	0.50
BTF	DLX	8	20	150	0.40	298	0.16	0.60	0.32	238	0.13	0.48	3.70	0.111	0.45
BTF	DLX	8	20	150	0.50	372	0.20	0.76	0.40	298	0.16	0.60	1.60	0.064	0.49
BTF	DLX	8	20	150	0.65	484	0.26	0.98	0.52	387	0.21	0.79	2.10	0.081	0.51
BTF	DLX	8	20	150	0.85	632	0.34	1.29	0.68	506	0.27	1.03	1.60	0.064	0.49
BTF	DLX	8	20	150	1.50	1,116	0.60	2.27	1.20	893	0.48	1.81	1.50	0.182	0.50
BTF	DLX	12	30	100	0.25	186	0.15	0.57	0.20	149	0.12	0.45	2.60	0.044	0.53
BTF	DLX	12	30	100	0.30	223	0.18	0.68	0.24	179	0.14	0.54	2.00	0.068	0.43
BTF	DLX	12	30	100	0.40	298	0.24	0.91	0.32	238	0.19	0.73	1.40	0.075	0.54
BTF	DLX	12	30	100	0.50	372	0.30	1.13	0.40	298	0.24	0.91	1.70	0.101	0.48
BTF	DLX	12	30	100	0.65	484	0.39	1.47	0.52	387	0.31	1.18	2.70	0.138	0.46
BTF	DLX	12	30	100	1.00	744	0.60	2.27	0.80	595	0.48	1.81	3.00	0.202	0.47
-	DLX	12	30	100	1.50	1,104	0.90	3.40	1.20	883	0.72	2.72	2.98	0.626	0.75
BTF	DLX	16	41	75	0.20	149	0.16	0.60	0.16	119	0.13	0.48	2.70	0.056	0.43
-	DLX	16	41	75	0.40	298	0.32	1.21	0.32	238	0.26	0.97	2.20	0.121	0.46
-	DLX	16	41	75	0.50	372	0.40	1.51	0.40	298	0.32	1.21	2.20	0.118	0.52
-	DLX	18	46	67	0.50	372	0.45	1.70	0.40	298	0.36	1.36	2.90	0.150	0.49
-	DLX	24	61	50	0.15	112	0.18	0.68	0.12	89	0.14	0.54	2.20	0.027	0.72
-	DLX	24	61	50	0.20	149	0.24	0.91	0.16	119	0.19	0.73	2.00	0.001	0.60
-	DLX	24	61	50	0.30	223	0.36	1.36	0.24	179	0.29	1.09	1.90	0.094	0.61
-	DLX	24	61	50	0.50	372	0.60	2.27	0.40	298	0.48	1.81	1.80	0.193	0.50

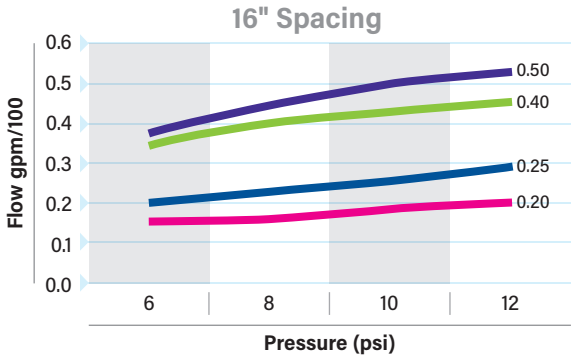
Note: K value calculation based on Manufacturing Specification of 3% Cv and 0.5 Exponent.

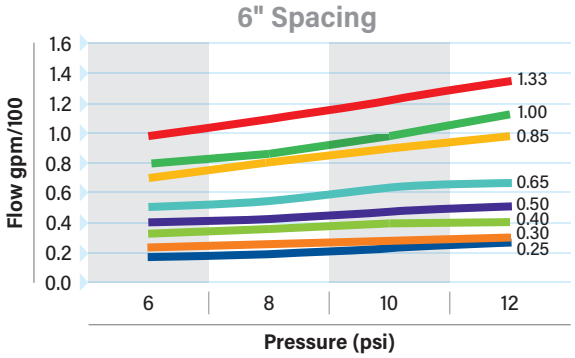
Performance Charts—Flow vs. Pressure

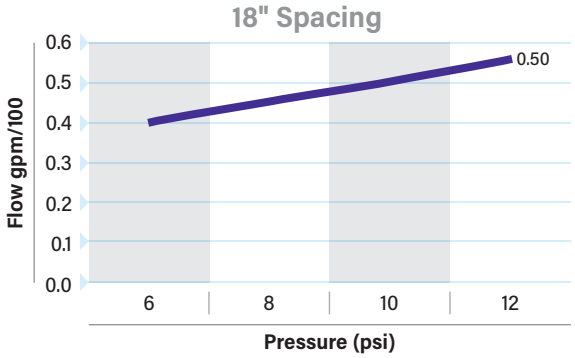


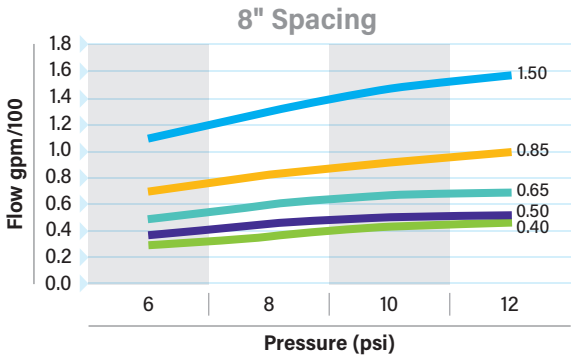


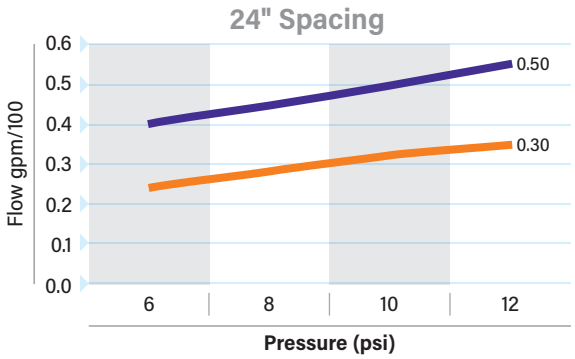












Installations

Storage and handling

- Protect Chapin Tape rolls from environmental conditions until installation
- Do not remove packaging or protective film until installation
- Do not drop or throw Chapin Tape rolls
- Do not drag or push Chapin Tape rolls over rough surfaces
- Do not cut through cardboard when removing protective film

Surface Installation

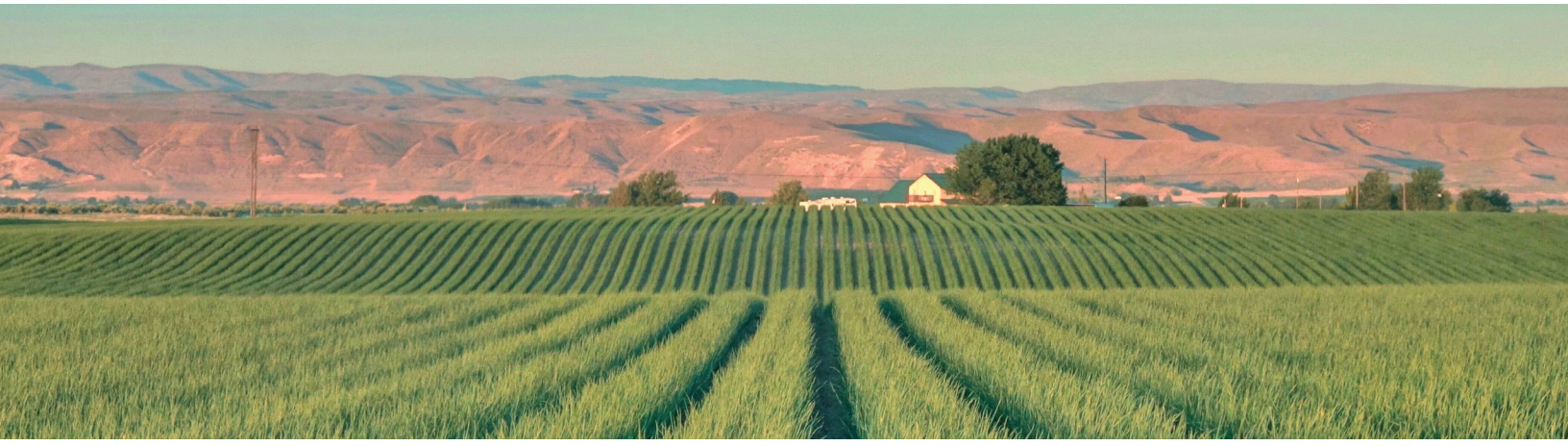
- Place tape on the windward side of the row
- Install with emitters facing upward
- Anchor Chapin Tape every 20 feet with wire staple or with dirt
- Leave extra tape on the ends for proper connection
- Leave end of tape open for initial flushing
- Surface drip tape should be held at both ends with end holders

Clear Plastic Mulch Installation

- When using clear plastic mulch, Chapin Tape must be buried to prevent sunburn caused by the magnifying glass effect

Mechanical Sub-Surface Installation

- Support both sides of roll with metal, plastic, or wooden backers
- Install outlets facing upwards
- Use adjustable braking mechanism to provide uniform tension on the roll
- Support the roll core with an insert plug
- Do not allow tape to rub against sharp objects or the side of the shank
- The shaft, reel and backers should all turn simultaneously
- Position the bottom of the roll 35 inches away from the funneled injection shank opening
- Avoid all possible damage to tape from bolts, worn-out or rusty metal parts, kinks and stretching
- Allow extra tape at the beginning and end of the row for proper connections
- Do not walk on top of the drip tape, in order to avoid compacting dirt
- Leave end of tape open for initial flushing
- Flush main, sub-main, and manifold before connecting the lateral drip line



Maintenance and Troubleshooting

Maintenance

- To prevent insect damage consult with a PCA for recommended pesticides, doses and timing of applications prior to tape installation
- Flush sub-main and lateral lines regularly in order to prevent plugging
- Filter water as recommended. Use sand media filters for surface water. Use 150 or 200 mesh screen filters for clean water sources. Filter must be maintained and cleaned regularly
- Always flush the lateral lines after fertilizer injection
- Schedule your irrigation time and frequency correctly. Root intrusion may occur when plants are stressed or when fertilizer remains in the lateral lines
- Analyze water supply on a regular basis to help forecast potential problems

Problem / Solution Guide

Problem	Description	Possible Solution
Dirt plugging in the turbulent channel	Sucking dirt into the tape when the water is shut off. As water drains after shut-off, a vacuum is formed	Install air relief valve(s)
Root intrusion in buried tape	Will occur when a plant is starved for water. Hairline roots will seek water and enter the turbulent channel	Schedule your irrigation time correctly/increase hours of water per day
Dirt in buried tape	Evidence of dirt throughout supply hose, inlet, outlet, turbulent channel	Adequate filtration
Ant/insect damage to drip wall tape	Small pin holes chewed in sides of drip tape and/or enlargement of outlet orifice. Most likely to occur with tapes below 15 mil	Spray and/or injection of appropriate insecticides; release of Beneficial's
Mechanical damage during installation	Punctures, tears, scratch marks	Flushing mains, sub mains before connecting drip tape. Use of acid to clean system. Check for line breakage
Clogging due to foreign materials after the filter system	Accumulated in mains and sub mains from prior season breakage of lines	Flushing mains, sub mains before connecting drip tape, use of acid to clean system. Check for line breakage
No water is flowing	Water is not being emitted	Check the connections to the submain. Check for adequate water pressure. Check for kinks of twists in the tape line. Check water supply
Precipitates	Discoloration at outlets	Check for possible build up of minerals, fertilizer, and/or bacterial slime
Reduced Flow	Reduction of water over time	Check that filter is properly cleaned and free of debris

Water Quality Management

Precipitates	None	Increasing	Severe	Possible Solutions
Iron (ppm)	0.0 to 0.1	0.1 to 0.4	0.4+	Use chlorine in proper solution to pH of 7 or lower
Manganese (ppm)	0.0 to 0.2	0.2 to 0.4	0.4+	Use chlorine in proper solution
Sulfides (ppm)	0.0 to 0.1	0.1 to 0.2	0.2+	Use acid in proper solution
Calcium Carbonate (ppm)	No levels established			Use acid in proper solution
Organic material	Slime, colored, deposits on emitter, odiferous			Use chlorine in proper solution

Reels of Tape Required Per Acre

5/8"		4 mil	5 mil	6 mil	-	8 mil	10 mil	-	12 mil	13 mil	15 mil	-	-
7/8"		-	-	-	5 mil	6 mil	-	8 mil	-	10 mil	-	13 mil	15 mil
Avg. tape spacing inches	Feet of tape per acre	13,000	12,000	10,000	9,000	7,500	6,000	5,500	5,000	4,500	4,000	3,500	3,000
30	17,424	1.34	1.45	1.74	1.94	2.32	2.90	3.17	3.48	3.87	4.36	4.98	5.81
32	16,335	1.26	1.36	1.63	1.82	2.18	2.72	2.97	3.27	3.63	4.08	4.67	5.45
34	15,374	1.18	1.28	1.54	1.71	2.05	2.56	2.80	3.07	3.42	3.84	4.39	5.12
36	14,520	1.12	1.21	1.45	1.61	1.94	2.42	2.64	2.90	3.23	3.63	4.15	4.84
38	13,756	1.06	1.15	1.38	1.53	1.83	2.29	2.50	2.75	3.06	3.44	3.93	4.59
40	13,068	1.01	1.09	1.31	1.45	1.74	2.18	2.38	2.61	2.90	3.27	3.73	4.36
42	12,446	0.96	1.04	1.24	1.38	1.66	2.07	2.26	2.49	2.77	3.11	3.56	4.15
44	11,880	0.91	0.99	1.19	1.32	1.58	1.98	2.16	2.38	2.64	2.97	3.39	3.96
46	11,363	0.87	0.95	1.14	1.26	1.52	1.89	2.07	2.27	2.53	2.84	3.25	3.79
48	10,890	0.84	0.91	1.09	1.21	1.45	1.82	1.98	2.18	2.42	2.72	3.11	3.63
50	10,454	0.80	0.87	1.05	1.16	1.39	1.74	1.90	2.09	2.32	2.61	2.99	3.48
52	10,052	0.77	0.84	1.01	1.12	1.34	1.68	1.83	2.01	2.23	2.51	2.87	3.35
54	9,680	0.74	0.81	0.97	1.08	1.29	1.61	1.76	1.94	2.15	2.42	2.77	3.23
56	9,334	0.72	0.78	0.93	1.04	1.24	1.56	1.70	1.87	2.07	2.33	2.67	3.11
58	9,012	0.69	0.75	0.90	1.00	1.20	1.50	1.64	1.80	2.00	2.25	2.57	3.00
60	8,712	0.67	0.73	0.87	0.97	1.16	1.45	1.58	1.74	1.94	2.18	2.49	2.90
62	8,431	0.65	0.70	0.84	0.94	1.12	1.41	1.53	1.69	1.87	2.11	2.41	2.81
64	8,168	0.63	0.68	0.82	0.91	1.09	1.36	1.49	1.63	1.82	2.04	2.33	2.72
66	7,920	0.61	0.66	0.79	0.88	1.06	1.32	1.44	1.58	1.76	1.98	2.26	2.64
68	7,687	0.59	0.64	0.77	0.85	1.02	1.28	1.40	1.54	1.71	1.92	2.20	2.56
70	7,467	0.57	0.62	0.75	0.83	1.00	1.24	1.36	1.49	1.66	1.87	2.13	2.49
72	7,260	0.56	0.61	0.73	0.81	0.97	1.21	1.32	1.45	1.61	1.82	2.07	2.42
74	7,064	0.54	0.59	0.71	0.78	0.94	1.18	1.28	1.41	1.57	1.77	2.02	2.35
76	6,878	0.53	0.57	0.69	0.76	0.92	1.15	1.25	1.38	1.53	1.72	1.97	2.29
78	6,702	0.52	0.56	0.67	0.74	0.89	1.12	1.22	1.34	1.49	1.68	1.91	2.23
80	6,534	0.50	0.54	0.65	0.73	0.87	1.09	1.19	1.31	1.45	1.63	1.87	2.18
82	6,375	0.49	0.53	0.64	0.71	0.85	1.06	1.16	1.27	1.42	1.59	1.82	2.12
84	6,223	0.48	0.52	0.62	0.69	0.83	1.04	1.13	1.24	1.38	1.56	1.78	2.07
86	6,078	0.47	0.51	0.61	0.68	0.81	1.01	1.11	1.22	1.35	1.52	1.74	2.03
88	5,940	0.46	0.50	0.59	0.66	0.79	0.99	1.08	1.19	1.32	1.49	1.70	1.98
90	5,808	0.45	0.48	0.58	0.65	0.77	0.97	1.06	1.16	1.29	1.45	1.66	1.94
92	5,682	0.44	0.47	0.57	0.63	0.76	0.95	1.03	1.14	1.26	1.42	1.62	1.89
94	5,561	0.43	0.46	0.56	0.62	0.74	0.93	1.01	1.11	1.24	1.39	1.59	1.85
96	5,445	0.42	0.45	0.54	0.61	0.73	0.91	0.99	1.09	1.21	1.36	1.56	1.82
98	5,334	0.41	0.44	0.53	0.59	0.71	0.89	0.97	1.07	1.19	1.33	1.52	1.78
100	5,227	0.40	0.44	0.52	0.58	0.70	0.87	0.95	1.05	1.16	1.31	1.49	1.74

Common Tape Selection and Flows

Spacing (inch)	Flow (gpm/100 feet)	Applications
12	0.25	Onions, Garlic, Sweet Potatoes
8	0.40	Strawberries, Lettuce
8	0.50	Tomatoes, Peppers
8	0.65	Melons, Cauliflower
12	0.50	Tomatoes, Strawberries, Broccoli
2	1.50	Cut Flowers
4	1.00	Vines, Landscape

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:

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