Toro Micro-Irrigation
2014-15 Product Catalog

TORO Count on it.

TORO. Count on it.

Toro Micro-Irrigation Product Catalog



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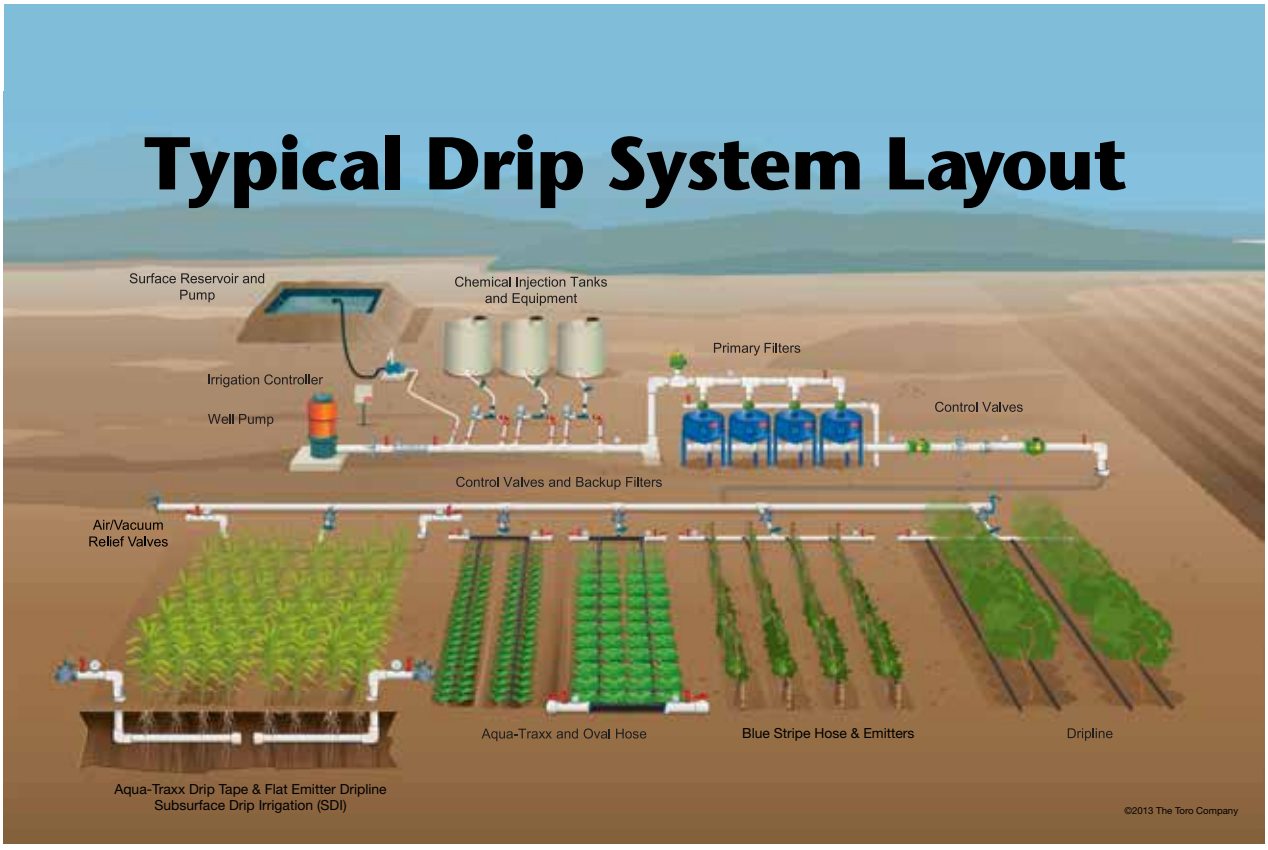
Drip Irrigation: A Better Way to Farm

Today it is more important than ever to use water resources wisely, irrigate intelligently, and take full advantage of the benefits drip irrigation offers. For instance, many farmers have enjoyed improved profitability with drip irrigation by **increasing crop yield and quality** while at the same time **reducing costs** from water, energy, labor, chemical inputs and water runoff. Other benefits include significant water and **capital investment savings** using drip, while simultaneously **improving plant vigor** by delivering water and nutrients directly to the plant roots and avoiding unnecessary wetting of plant leaves. In addition, drip irrigation allows for **targeted, intelligent water applications**, where runoff, leaching and the wetting of non-targeted areas are avoided or completely eliminated. Whether the motivation is improved profitability or better resource use, drip irrigation makes sense.



A Company You Can Count On

A Century of Innovation

Since July 10, 1914, a long line of ingenious Toro inventors have developed dramatic breakthroughs that helped establish and strengthen the Company's leadership role and revolutionize the industries in which we compete. As we embark upon our second century, the people of Toro will continue to lead with our relentless drive to innovate. At Toro, innovation is more than a slogan; it is our lifeblood, our legacy, our commitment to all the customers we are honored to serve.

Toro Customer Care

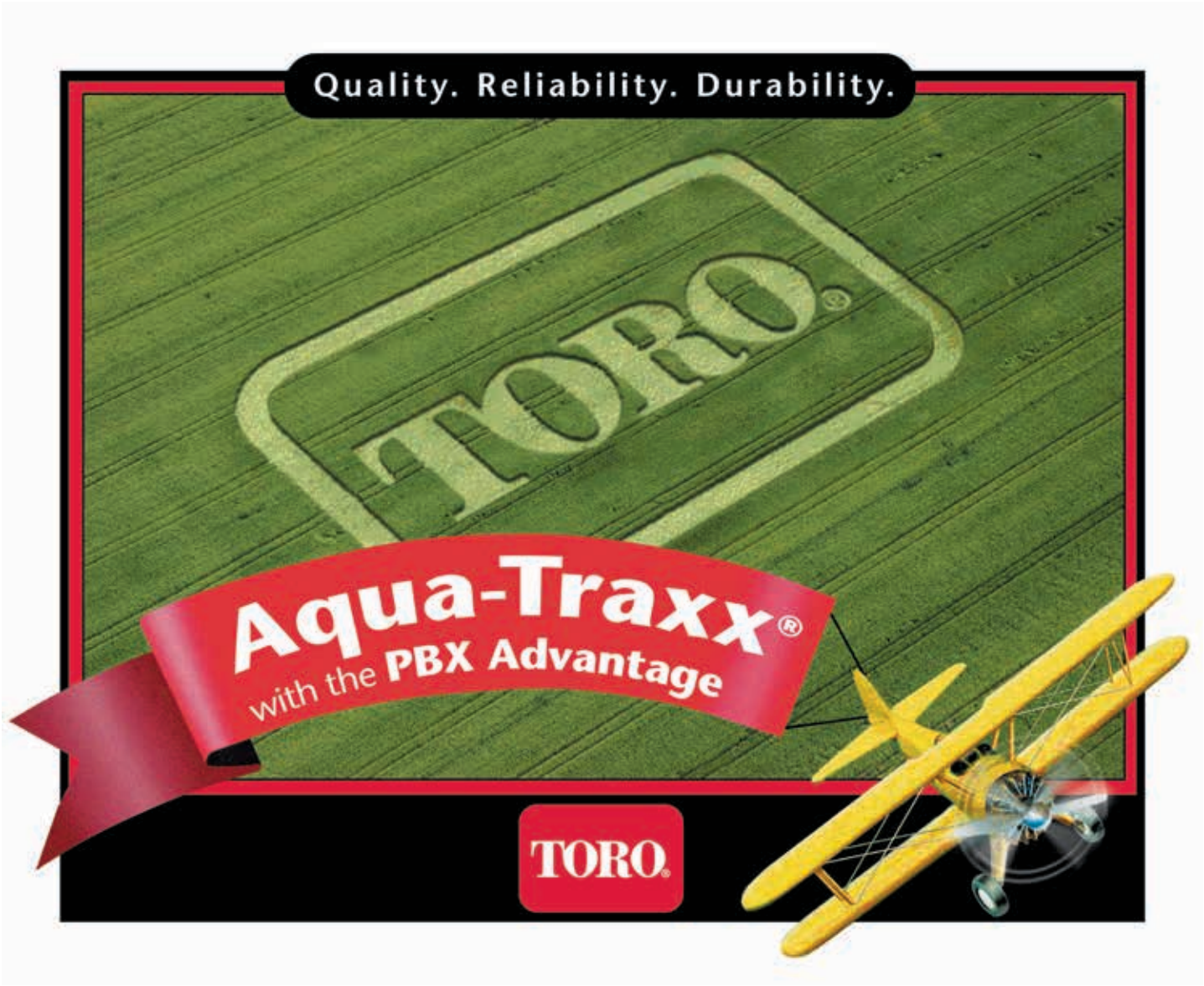
Our customer service team and technical experts are truly extraordinary at what they do. With well over 100 years of irrigation experience, you can depend on us. For unbeatable customer service and support, call 1 (800) 333-8125 or 1 (619) 562-2950.

Educational Resources

At Toro, we are dedicated to providing educational material and resources that help you make the most out of your drip irrigation system. From educational brochures, to online drip irrigation calculators, to the "must have" Drip Irrigation Owner's Manual, we make sure you have enough information to become knowledgeable disciples of drip irrigation.

Online Information

At Toro.com, we ensure that you are up-to-date and offer a complete, real-time listing of all our drip irrigation products, along with product literature, finance information, and a link to our Price List. Also, be sure to visit our educational website, driptips.toro.com and sign up for our eNewsletter.


Quality. Reliability. Durability.
TORO
Aqua-Traxx®
with the PBX Advantage
TORO


Tape

The Tale of the Tape

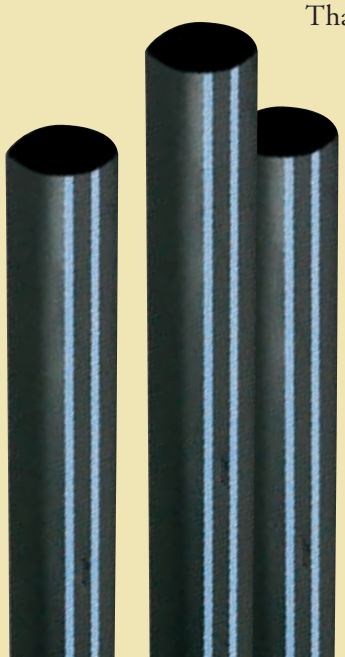
Install an ordinary drip tape and you'll be locked into ordinary results. That's because ordinary tapes can't affordably offer emitters spaced closer than 12 inches, *and* they may be more likely to plug.

But install premium drip tape — **Aqua-Traxx® with the PBX Advantage** — and you'll enjoy extraordinary results and durability. So, what's the PBX Advantage? Unmatched precision.

With options from 4 to 24 inches, you can select the emitter **spacing and flow rates that work best** for your soil type, crop and application needs.

Plus, the advanced flowpath design helps reduce clogging, so you'll worry less about plants going thirsty. **Precise. Efficient. Practical.** That's the PBX Advantage.

That's the tape you want. ***Ask us for more details or visit*** *toro.com*



Aqua-Traxx®
with the **PBX Advantage**

TORO® **Count on it.**

Aqua-Traxx®
with the **PBX Advantage**

Aqua-Traxx with the PBX Advantage is the result of more than 30 years of drip tape research, development and manufacturing from Toro Micro-Irrigation. Aqua-Traxx with the PBX Advantage incorporates a Proportionally Balanced Cross-Section (PBX) design that optimizes emitter turbulence to effectively manage water flow, deliver uniform distribution and reduce clogging. With superior strength, uniformity, durability and reliability, no other drip tape matches the performance of Aqua-Traxx.

FEATURES & BENEFITS

Premium Drip Tape with Unmatched Precision.

Precision

- Emitter spacing options from 4 to 24 inches
- Flow rates that match your soil type
- Accurately delivers water, fertilizer and chemicals

Uniformity

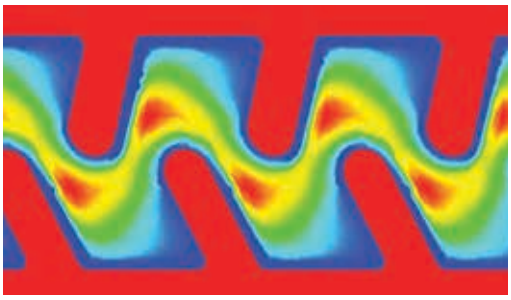
- Advanced flowpath design ensures accurate delivery of water from every emitter
- Best-in-class coefficients of variation (Cv's) — below 3 percent

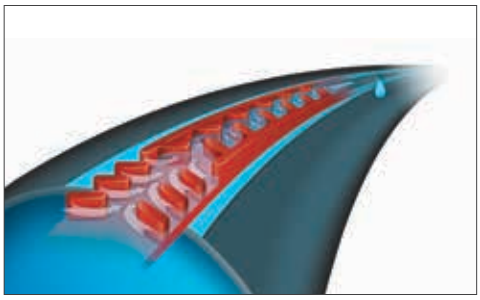
Durability

- Seamless construction provides maximum strength
- Premium materials provide ultra-high strength and flexibility

Plugging Resistance

- Extra-large cross-sectional area helps prevent clogging
- PBX flowpath requires only 140-mesh filtration for most flow rates





The Proportionally Balanced Cross-Section (PBX) design optimizes flowpath turbulence to effectively manage water flow, deliver uniform distribution and reduce clogging.

SPECIFICATIONS

Diameter	Wall Thickness	Operating Pressure				Reel Length		Reel Weight	
		psi		bar					
		min	max	min	max	ft	meters	lbs	Kg
5/8" (16mm)	4 mil	4	8	0.3	0.55	15,000	4,572	66	30
	5 mil	4	10	0.3	0.7	13,000	3,962	72	33
	6 mil	4	12	0.3	0.8	10,000	3,048	64	29
	8 mil	4	15	0.3	1.0	7,500	2,286	66	30
	10 mil	4	15	0.3	1.0	6,000	1,829	63	29
	12 mil	4	15	0.3	1.0	5,100	1,554	63	29
	15 mil	4	15	0.3	1.0	4,000	1,219	63	29
5/8" (16mm) Short Reels	6 mil	4	12	0.3	1.0	2,500	762	17	8
	8 mil	4	15	0.3	1.0	2,000	610	17	8
	15 mil	4	15	0.3	1.0	1,000	305	16	7
7/8" (22mm)	6 mil	4	10	0.3	0.7	7,380	2,250	68	31
	8 mil	4	15	0.3	1.0	6,000	1,829	72	33
	10 mil	4	15	0.3	1.0	4,400	1,341	71	32
	12 mil	4	15	0.3	1.0	4,000	1,219	72	33
	15 mil	4	15	0.3	1.0	3,000	914	66	30
1" (25mm)	13 mil	4	15	0.3	1.0	3,000	914	66	30
1 3/8" (35mm)	15 mil	4	15	0.3	1.0	2,700	823	87	39

Available in ready-to-ship boxes or stretch wrapped reels.

Understanding Aqua-Traxx Part Numbers

X - Denotes the diameter. 5 for 5/8", 7 for 7/8", 8 for 1", and 11 for 1 3/8"
xx - Denotes mil thickness

Example: EA 5 10 08 34 – 600

- EA — Non-pressure compensating
- 5 — Diameter as 5/8"
- 10 — 10 mil thickness
- 08 — 8" spacing
- 34 — Q-100 flow rate at 8 psi
- 600 — Reel length

Note: Install with blues stripes up.

FLOW RATES

Available in 4, 5, 6, 8, 10, 12 & 15 mil Tape

Emitter Flow Part Number	Outlet Spacing Spacing		Emitter Flow Rate				Q-100				Emitter Exponent	Filtration Requirement mesh(micron)
			gph		lph		gpm / 100 ft		lph / 1 meter			
	in	cm	@ 8 psi	@ 10 psi	@ 0.55 bar	@ 0.7 bar	@ 8 psi	@ 10 psi	@ 0.55 bar	@ 0.7 bar		
0.07 gph emitter												
EAXxx0817	8	20	0.07	0.08	0.26	0.30	0.17	0.20	1.30	1.47	0.55	200 (74)
EAXxx1609	16	40	0.07	0.08	0.26	0.30	0.09	0.10	0.65	0.74		
0.09 gph emitter												
EAXxx0822	8	20	0.09	0.10	0.34	0.38	0.22	0.25	1.66	1.88	0.55	200 (74)
EAXxx1611	16	40	0.09	0.10	0.34	0.38	0.11	0.13	0.83	0.94		
0.10 gph emitter												
EAXxx0825	8	20	0.10	0.11	0.38	0.43	0.25	0.28	1.86	2.11	0.55	200 (74)
EAXxx1613	16	40	0.10	0.11	0.38	0.43	0.13	0.14	0.93	1.05		
0.13 gph emitter												
EAXxx0467	4	10	0.13	0.15	0.51	0.57	0.67	0.75	4.99	5.58	0.50	140 (105)
EAXxx0644	6	15	0.13	0.15	0.51	0.57	0.44	0.50	3.33	3.72		
EAXxx0834	8	20	0.13	0.15	0.51	0.57	0.34	0.37	2.50	2.79		
EAXxx1222	12	30	0.13	0.15	0.51	0.57	0.22	0.25	1.66	1.86		
EAXxx1617	16	40	0.13	0.15	0.51	0.57	0.17	0.19	1.25	1.40		
EAXxx1814	18	45	0.13	0.15	0.51	0.57	0.14	0.17	1.11	1.24		
EAXxx2411	24	60	0.13	0.15	0.51	0.57	0.11	0.12	0.83	0.93		
0.15 gph emitter												
EAXxx0650	6	15	0.15	0.17	0.57	0.63	0.50	0.56	3.73	4.17	0.50	140 (105)
EAXxx1225	12	30	0.15	0.17	0.57	0.63	0.25	0.28	1.86	2.08		
EAXxx1817	18	45	0.15	0.17	0.57	0.63	0.17	0.19	1.24	1.39		
0.20 gph emitter												
EAXxx04100	4	10	0.20	0.22	0.76	0.85	1.00	1.12	7.47	8.36	0.50	140 (105)
EAXxx0667	6	15	0.20	0.22	0.76	0.85	0.67	0.75	4.99	5.58		
EAXxx0850	8	20	0.20	0.22	0.76	0.85	0.50	0.56	3.74	4.18		
EAXxx1234	12	30	0.20	0.22	0.76	0.85	0.34	0.37	2.50	2.79		
EAXxx1625	16	40	0.20	0.22	0.76	0.85	0.25	0.28	1.87	2.09		
EAXxx1822	18	45	0.20	0.22	0.76	0.85	0.22	0.25	1.67	1.86		
EAXxx2417	24	60	0.20	0.22	0.76	0.85	0.17	0.19	1.25	1.40		
0.27 gph emitter												
EAXxx04134	4	10	0.27	0.30	1.01	1.13	1.34	1.50	9.99	11.16	0.50	140 (105)
EAXxx0690	6	15	0.27	0.30	1.01	1.13	0.90	1.00	6.66	7.44		
EAXxx0867	8	20	0.27	0.30	1.01	1.13	0.67	0.75	4.99	5.58		
EAXxx1245	12	30	0.27	0.30	1.01	1.13	0.45	0.50	3.33	3.72		
EAXxx1634	16	40	0.27	0.30	1.01	1.13	0.34	0.37	2.50	2.79		
EAXxx1830	18	45	0.27	0.30	1.01	1.13	0.30	0.33	2.22	2.48		
EAXxx2422	24	60	0.27	0.30	1.01	1.13	0.22	0.25	1.67	1.86		
0.34 gph emitter												
EAXxx04168	4	10	0.34	0.37	1.27	1.42	1.68	1.87	12.48	13.95	0.50	140 (105)
EAXxx06112	6	15	0.34	0.37	1.27	1.42	1.12	1.25	8.33	9.31		
EAXxx0884	8	20	0.34	0.37	1.27	1.42	0.84	0.94	6.24	6.98		
EAXxx1256	12	30	0.34	0.37	1.27	1.42	0.56	0.62	4.16	4.65		
EAXxx1642	16	40	0.34	0.37	1.27	1.42	0.42	0.47	3.12	3.49		
EAXxx1838	18	45	0.34	0.37	1.27	1.42	0.38	0.42	2.78	3.10		
EAXxx2428	24	60	0.34	0.37	1.27	1.42	0.28	0.31	2.08	2.33		
0.53 gph emitter												
EAXxx04265	4	10	0.53	0.59	2.01	2.24	2.65	2.96	19.75	22.08	0.50	140 (105)
EAXxx08133	8	20	0.53	0.59	2.01	2.24	1.33	1.48	9.87	11.04		
EAXxx1288	12	30	0.53	0.59	2.01	2.24	0.88	0.99	6.58	7.36		
EAXxx1666	16	40	0.53	0.59	2.01	2.24	0.66	0.74	4.94	5.52		
EAXxx2444	24	60	0.53	0.59	2.01	2.24	0.44	0.49	3.29	3.68		
EAXxx3629	36	90	0.53	0.59	2.01	2.24	0.29	0.33	2.19	2.45		

* X denotes the diameter. 5 for 5/8", 7 for 7/8", 8 for 1" and 11 for 1-3/8"

** xx denotes mil thickness.

*** 1" only available in 13 mil.

Metric outlet spacing expressed in nominal length.

Aqua-Traxx® PC
Pressure Compensating Tape

An all-terrain, high performance drip tape.
Aqua-Traxx PC is the industry's only pressure compensating drip tape. It increases profitability by saving water, energy and chemical costs and it allows for optimum results on land that was once considered marginal. The superior performance of Aqua-Traxx PC takes drip tape to the next level.

APPLICATIONS
- Ideal to irrigate crops in difficult topographical conditions
- In areas of high wind where spray losses and poor uniformity would be unavoidable with sprinklers
- In areas with low or varying water pressure and in installations requiring long laterals

ADVANTAGES
- Increased Emission Uniformity (EU)
- Saves water
- Saves energy due to water savings and lower system pressures
- Lower application rates nearly eliminate runoff problems
- Saves fertilizer and other chemicals
- Saves labor cost. Fertilizers and chemicals are applied through the system and there are no pipes to move
- Easier access to the field for tractor operations
- Avoids spray losses, evaporation and non-uniformity caused by windy conditions
- Reduces diseases caused by high humidity, such as mildew
- Systems are more economical due to smaller pipe size requirements, which are made possible by lower flow rates
- Reduces herbicide and weeding labor

VERSATILITY
- Aqua-Traxx PC is available in spacing from 6" to 24"
- Wide pressure operating range: 4 – 25 psi.
- Significant elevation changes either down slopes or over undulating terrain

TUBE FEATURES:
- Seamless construction
- Blue stripes, signature of quality. Blue stripes "up" insures proper outlet placement

EMITTER FEATURES
- Filter inlets - prevents debris from entering the flow path
- Turbulent flow path
- Pressure compensating
- Multiple laser slit outlets – Less susceptible to back siphoning and root intrusion
- Precise performance

PRODUCT RANGE

Diameter	Wall Thickness	Pressure (psi)		Reel Length (ft.)	Reel Weight (lbs.)
		min	max		
5/8"	8 mil	4	16	7,500	63
	10 mil	4	20	6,000	60
	12 mil	4	22	5,100	58
	15 mil	4	25	4,000	61
7/8"	10 mil	4	18	4,400	65
	12 mil	4	20	4,000	61
	15 mil	4	22	3,000	62
1⅜"	15 mil	4	18	2,700	87

FLOW RATE

Part Number	Individual Emitter Flow Rate (gph) @10 psi	spacing (in.)	Q-100 GPM per 100 ft. @10 psi
.20 gph @ 10 psi			
EAPXxx0667	0.20 gph	6"	0.67
EAPXxx0850	0.20 gph	8"	0.50
EAPXxx1234	0.20 gph	12"	0.34
EAPXxx1625	0.20 gph	16"	0.25
EAPXxx1822	0.20 gph	18"	0.22
EAPXxx2417	0.20 gph	24"	0.17
.27 gph @ 10 psi			
EAPXxx0690	0.27 gph	6"	0.90
EAPXxx0867	0.27 gph	8"	0.67
EAPXxx1245	0.27 gph	12"	0.45
EAPXxx1634	0.27 gph	16"	0.34
EAPXxx1830	0.27 gph	18"	0.30
EAPXxx2422	0.27 gph	24"	0.22

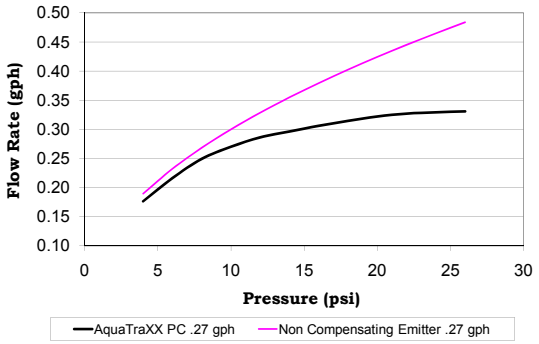
SPECIFICATIONS

Coefficient of Variation (CV)	All emitters	≤3%
Flow Exponent (x)	All emitters	0.3
Inside Diameter	5/8"	0.635
Inside Diameter	7/8"	0.875
Inside Diameter	1⅜"	1.375
Operating pressure range	4-25 psi	see chart for different mill thicknesses
Hazen-Williams C factor	All tube sizes	140
Minimum filtration requirement	All emitters	200 mesh (74 micron)

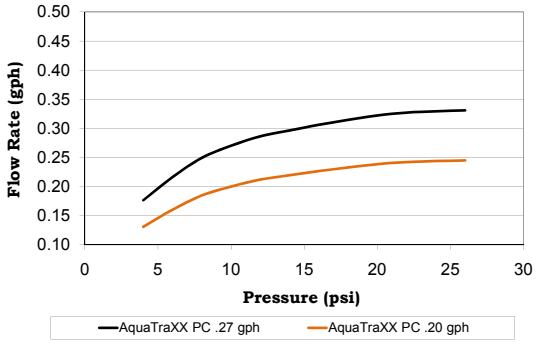
Note: To determine the Flow Coefficient (C), refer to the Emission Device Flow Formula on page 125, and solve for C using an operating pressure of 10 psi.

Kd = 0

EMITTER FLOW VS PRESSURE



EMITTER FLOW VS PRESSURE OF AQUA-TRAXX PC



Understanding Aqua-Traxx Part Numbers
Aqua-Traxx PC
X - Denotes the diameter. 5 for 5/8", 7 for 7/8"
xx - Denotes mil thickness

Example: EAP 5 10 08 50 – 600

- EAP — Pressure Compensating
- 5 — Diameter as 5/8"
- 10 — 10 mil thickness
- 08 — 8" spacing
- 50 — Q-100 flow rate at 10 psi
- 600 — Reel length

Note: Install with blues stripes up.

PERFORMANCE CHARTS

Part Number **EAP5xx0867-xxx**
5/8" Diameter 0.67 gpm /100' @ 10 psi
Inlet Pressure (psi)

0 % Slope EU%	10	12	14	16	18
94	350	375	375	375	375
92	425	450	450	475	500
90	475	500	500	525	525

3% Downslope EU%	10	12	14	16	18
94	475	500	500	525	525
92	575	600	600	600	625
90	625	650	675	675	675

6% Downslope EU%	10	12	14	16	18
94	75	100	100	125	500
92	475	550	600	625	650
90	625	650	675	700	725

Part Number **EAP5xx0850-xxx**
5/8" Diameter 0.50 gpm /100' @ 10 psi
Inlet Pressure (psi)

0 % Slope EU%	10	12	14	16	18
94	425	450	450	475	475
92	525	550	550	575	575
90	575	600	625	650	650

3% Downslope EU%	10	12	14	16	18
94	525	575	600	600	625
92	675	725	725	750	750
90	775	800	825	825	850

6% Downslope EU%	10	12	14	16	18
94	75	75	100	125	125
92	150	175	500	700	750
90	700	775	800	825	850

Pro-Loc™ Tape Fittings

PRO-LOC TAPE FITTINGS		
Couplings		
	FTC500	5/8" Tape Coupling
	FTC700	7/8" Tape Coupling
	FTC800	1" Tape Coupling
Barb Adapters		
	FTA5-250B	5/8" Tape x 250 Series Barb Adapter
	FTA5-400B	5/8" Tape x 400 Series Barb Adapter
	FTA5-700B	5/8" Tape x 700 Series Barb Adapter
	FTA7-700B	7/8" Tape x 700 Series Barb Adapter
	FTA5-425G	5/8" Tape x 425 Series Barb Adapter with Integral Gasket*
	FTA5-425GR	5/8" Tape x 425 Series Barb Adapter with Rubber Grommet*
	FTA7-425GR	7/8" Tape x 425 Series Barb Adapter with Rubber Grommet*
Grommets		
	FTHG4	Top Hat Grommet for 400 - 425 Series Barbs
Tape End Plugs		
	FTA5-END	5/8" Tape End Plug
	FTA7-END	7/8" Tape End Plug
Adapters		
	FTA5-75FHS	5/8" Tape x 3/4" Female Hose Swivel Adapter
	FTA5-75MPT	5/8" Tape x 3/4" MPT Male Adapter
	FTA7-75MPT	7/8" Tape x 3/4" MPT Male Adapter
Flush Valves		
	FFVFPT-L	Automatic Flush Valve x 3/4" Female Low Flow - White
	FFVFPT-H	Automatic Flush Valve x 3/4" Female High Flow - Red
	FTA5-FVL	5/8" Tape x Low Pressure Flush Valve
	FTA7-FVL	7/8" Tape x Low Pressure Flush Valve

PRO-LOC TAPE FITTINGS		
Layflat Takeoff Fittings		
	FTA5-LF	5/8" Tape x Layflat Takeoff - Single Grip**
	FTA7-LF	7/8" Tape x Layflat Takeoff - Single Grip**
	FTA5-LF2	5/8" Tape x Layflat Takeoff - Double Grip**
Barbed Hose Adapters		
	FTA5-500HB	5/8" Tape x 500 Series Hose Barb Adapter
	FTA5-700HB	5/8" Tape x 700 Series Hose Barb Adapter
	FTA7-700HB	7/8" Tape x 700 Series Hose Barb Adapter
Tees		
	FTT500	5/8" Tape Tee
	FTT700	7/8" Tape Tee
Barbed Tees		
	FTT5-500HB	5/8" Tape Tee x 500 Series Hose Barb
	FTT5-700HB	5/8" Tape Tee x 700 Series Hose Barb
Hose Nut Adapters		
	FTA5-600HN	5/8" Tape x 600 Series Pro-Loc Adapter with Locking Nut
Shutoff Valves		
	FTV500	5/8" Tape Shutoff Valve
	FTV700	7/8" Tape Shutoff Valve
	FTV5-250B	5/8" Tape x 250 Barb Adapter Shutoff Valve
	FTV7-250B	7/8" Tape x 250 Barb Adapter Shutoff Valve
	FTV5-400B	5/8" Tape x 400 Barb Adapter Shutoff Valve
	FTV7-400B	7/8" Tape x 400 Barb Adapter Shutoff Valve
Barbed Shutoff Valve with Locking Nut		
	FTV5-420BN	5/8" Tape x 420 Series Barb with Locking Nut Shutoff Valve
	FTV5-500HN	5/8" Tape x 500 Series Hose Barb with Locking Nut Shutoff Valve
Barbed Shutoff Valves		
	FTV5-500HB	5/8" Tape x 500 Series Hose Barb Shutoff Valve
	FTV7-500HB	7/8" Tape x 500 Series Hose Barb Shutoff Valve
Layflat Takeoff Shutoff Valve		
	FTV5-LF	5/8" Tape x Layflat Takeoff Shutoff Valve**
	FTV7-LF	7/8" Tape x Layflat Takeoff Shutoff Valve**

* 15mm or 0.59" drill size

** Requires a 14mm layflat punch

INSTALLATION TOOLS

Layflat installation Tools

	LF-INST	T-Handle Hex Tool for Layflat Installation
	LF-CUT14	Layflat Cutter - 14mm
	LF-CUT16	Layflat Cutter - 16mm
	LF-CUT19	Layflat Cutter - 19mm

400 Series Barb Tool

	INS-400XS	400B Cutting and Inserting Tool - Extra Short
	INS-400S	400B Cutting and Inserting Tool - Short
	INS-400AS	400B Cutting and Inserting Tool with Adjustable Tip - Short
	INS-400AL	400B Cutting and Inserting Tool with Adjustable Tip - Long
	TIP-400XS	400B Replacement Tip - Extra Short
	TIP-400S	400B Replacement Tip - Short
	TIP-400AS	400B Replacement Adjustable Tip - Short
	TIP-400AL	Replacement Adjustable Tip - Long

TUBING

Tape x Tubing Assembly

	FTA5-CL12B	5/8" Pro-Loc Tapex 400B w/12" tubing assembly
	FTA5-CL18B	5/8" Pro-Loc Tapex 400B w/18" tubing assembly
	FTA5-CL24B	5/8" Pro-Loc Tapex 400B w/24" tubing assembly
	FTA5-CL30B	5/8" Pro-Loc Tapex 400B w/30" tubing assembly


ALL-TERRAIN
AQUA-TRAXX®
PC
Pressure Compensating Drip Tape
TORO

Flat Emitter Dripline

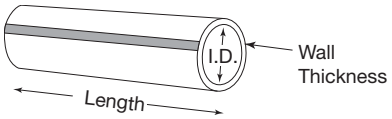
Neptune

Flat Emitter Dripline

FEATURES & BENEFITS

- Highly resistant to plugging – Discrete emitters stand up to challenging water and organic fertilizers
- Ultra-high strength and durability – Strength and flexibility make for easy installation and removal, saving on time and labor, and significantly reducing chances of damage
- Blue Stripe of Toro quality – Blue stripe installed up insures proper outlet placement
- Precision performance – Excellent Cv ≤ 3%
- Five different flow rates available – Nominal 0.16, 0.25, 0.30, 0.47, and 0.75 GPH
- Available in 10, 13, and 15 mil wall thicknesses
- Available in popular 5/8" and 7/8" internal diameters
- Compatible with all Toro Pro Loc™ tape fittings
- Operating pressure between 6-25 PSI, depending on ID and wall thickness
- 120 mesh filtration required

Neptune is ideal for use in demanding applications where thicker walled products can provide greater durability such as subsurface drip irrigation (SDI). The exceptional durability of the materials selected for this product makes installation and retrieval easier and extends the useful life of the Neptune. The discrete emitter in the flat emitter dripline resists plugging and is a good choice for applications expected to last. Neptune can stand up to rocky and abrasive soils that require a thicker tube, and it is ideal for semi-permanent crops in which the tubing needs to withstand pruning and harvest damage.



Neptune part numbering system

Example: TW 5 10 12 16 – 620

- TW — Neptune product
- 5 — Internal diameter in inches, 5/8"
- 10 — Wall thickness in mil
- 12 — Emitter Spacing in inches
- 16 — Emitter flow rate in GPH
- 620 — Reel length in 10 ft

Note: Install Neptune with blue stripe up.

Flow Rates
Available in 10, 13, and 15 mil wall thickness

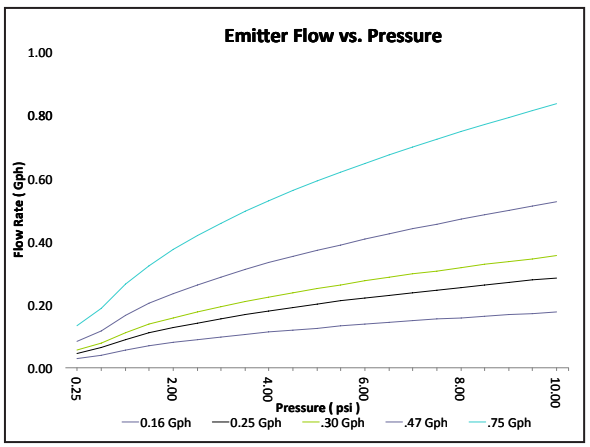
Part number	Outlet Spacing		Individual Emitter Flow Rate GPH		Individual Emitter Flow Rate LPH			Q-100 (gpm/ 100 ft)		Q-100 (lph/ 1 meter)	
	Inches	cm	a 8 psi	a 10 psi	@ 0.55 bar	@ 0.7 bar	@ 1 bar	@ 8 psi	@ 10 psi	@ 0.55 bar	@ 0.7 bar
0.16 gph @ 8 psi											
TWXxx1216	12"	30	0.16	0.18	0.60	0.67	0.80	0.26	0.29	1.96	2.20
TWXxx1416	14"	35	0.16	0.18	0.60	0.67	0.80	0.23	0.25	1.68	1.88
TWXxx1616	16"	40	0.16	0.18	0.60	0.67	0.80	0.20	0.22	1.47	1.65
TWXxx1816	18"	45	0.16	0.18	0.60	0.67	0.80	0.18	0.20	1.31	1.47
TWXxx2016	20"	50	0.16	0.18	0.60	0.67	0.80	0.16	0.18	1.18	1.32
TWXxx2416	24"	60	0.16	0.18	0.60	0.67	0.80	0.13	0.15	0.98	1.10
0.25 gph @ 8 psi											
TWXxx1225	12"	30	0.25	0.29	0.95	1.08	1.30	0.42	0.47	3.10	3.54
TWXxx1425	14"	35	0.25	0.29	0.95	1.08	1.30	0.36	0.41	2.66	3.03
TWXxx1625	16"	40	0.25	0.29	0.95	1.08	1.30	0.32	0.36	2.33	2.65
TWXxx1825	18"	45	0.25	0.29	0.95	1.08	1.30	0.28	0.32	2.07	2.36
TWXxx2025	20"	50	0.25	0.29	0.95	1.08	1.30	0.25	0.28	1.86	2.12
TWXxx2425	24"	60	0.25	0.29	0.95	1.08	1.30	0.21	0.24	1.55	1.77
0.30 gph @ 8 psi											
TWXxx1230	12"	30	0.30	0.34	1.14	1.27	1.56	0.50	0.57	3.73	4.16
TWXxx1430	14"	35	0.30	0.34	1.14	1.27	1.56	0.43	0.49	3.19	3.57
TWXxx1630	16"	40	0.30	0.34	1.14	1.27	1.56	0.38	0.43	2.79	3.12
TWXxx1830	18"	45	0.30	0.34	1.14	1.27	1.56	0.33	0.38	2.48	2.77
TWXxx2030	20"	50	0.30	0.34	1.14	1.27	1.56	0.30	0.34	2.24	2.50
TWXxx2430	24"	60	0.30	0.34	1.14	1.27	1.56	0.25	0.28	1.86	2.08
0.47 gph @ 8 psi											
TWXxx1247	12"	30	0.47	0.53	1.78	1.99	2.40	0.78	0.87	5.84	6.52
TWXxx1447	14"	35	0.47	0.53	1.78	1.99	2.40	0.67	0.75	5.00	5.59
TWXxx1647	16"	40	0.47	0.53	1.78	1.99	2.40	0.59	0.66	4.38	4.89
TWXxx1847	18"	45	0.47	0.53	1.78	1.99	2.40	0.52	0.58	3.89	4.35
TWXxx2047	20"	50	0.47	0.53	1.78	1.99	2.40	0.47	0.52	3.50	3.91
TWXxx2447	24"	60	0.47	0.53	1.78	1.99	2.40	0.39	0.44	2.92	3.26
0.75 gph @ 8 psi											
TWXxx1275	12"	30	0.75	0.84	2.83	3.16	3.80	1.24	1.39	9.28	10.37
TWXxx1475	14"	35	0.75	0.84	2.83	3.16	3.80	1.07	1.19	7.95	8.89
TWXxx1675	16"	40	0.75	0.84	2.83	3.16	3.80	0.93	1.04	6.96	7.78
TWXxx1875	18"	45	0.75	0.84	2.83	3.16	3.80	0.83	0.93	6.18	6.91
TWXxx2075	20"	50	0.75	0.84	2.83	3.16	3.80	0.75	0.83	5.57	6.22
TWXxx2475	24"	60	0.75	0.84	2.83	3.16	3.80	0.62	0.70	4.64	5.19

X - denotes 5 for 5/8" diameter, 7 for 7/8" diameter
xx - denotes mil thickness
Nominal flow per emitter at 8 PSI

Specifications

Diameter	Wall Thickness	Operating Pressure				Reel Length	
		psi		bar			
		min	max	min	max	ft	meters
5/8" (16 mm)	10	6	20	0.41	1.38	6,200	1,890
	13	6	22	0.41	1.52	4,700	1,433
	15	6	25	0.41	1.72	4,200	1,280
7/8" (22 mm)	10	6	15	0.41	1.03	4,900	1,494
	13	6	18	0.41	1.24	4,000	1,219
	15	6	20	0.41	1.38	2,700	823

Flow rate nominal GPH at 8 PSI	Coefficient of Variation (Cv)	Barb loss factor (Kd) for 5/8" tubing	Barb loss factor (Kd) for 7/8" tubing	Emitter Exponent	K Value	Filtration
0.16	≤ 3%	.10	.05	0.52	0.06	120 mesh
0.25	≤ 3%	.10	.05	0.53	0.08	120 mesh
0.30	≤ 3%	.10	.05	0.53	0.10	120 mesh
0.47	≤ 3%	.10	.05	0.50	0.17	120 mesh
0.75	≤ 3%	.10	.05	0.50	0.27	120 mesh



Count on it.


Dripline

BlueLine® PC

Premium Pressure Compensating Dripline

Premium pressure compensating dripline with unmatched precision. Through its innovative emitter design, BlueLine PC represents a tremendous advancement in dripline irrigation by providing:

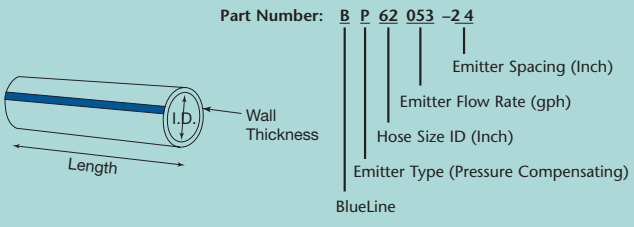
- Pressure compensation
- Greater resistance to plugging
- Unrivaled durability
- Superior flow accuracy

BlueLine® PC

Premium Pressure Compensating Dripline

The innovative features of BlueLine PC make it the latest and most advanced choice for permanent crop applications utilizing any installation technique: above ground, below ground or hanging on a wire.

Understanding Part Numbers



ADDITIONAL FEATURES

The Latest Technology
The exclusive Toro flow path technology is the result of 30 years of emitter design in combination with the latest in computer aided design.

More Resistant to Plugging
With unique raised inlets the amount of debris entering the emitter is dramatically reduced.

Unmatched Uniformity
The Toro flow path technology uses a shark tooth design providing a fully turbulent flow path that is independent from the wall of the tubing providing unmatched uniformity.

Self-flushing Diaphragm
Patented new design flushes during operation and shutdown, further resisting clogging and providing longer life for your system.

New Anti-siphon Feature
Reduces susceptibility to back siphoning.

Precision Laser Technology
Laser drilled outlets are created using the precision laser technology pioneered by Toro Micro-Irrigation.

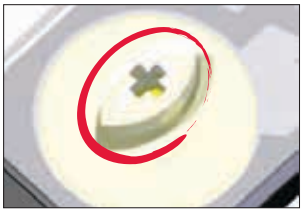
Easy Field Identification
The Blue Stripe identifier of quality allows for ease of identifying emitter location as needed during installation and/or operation.

Accurate Flow Rate
Fully pressure compensating from 10 to 60 psi.

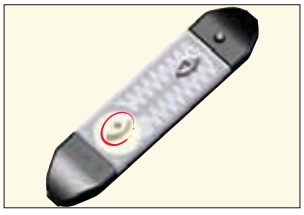
Wide variety of emitter spacings
Standard or custom spacings available.

Improved Barb Loss
The new low profile emitter reduces friction loss.

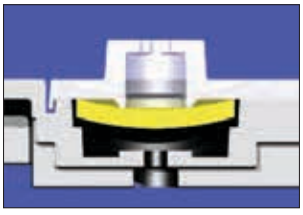
Improved Hydraulics
Improvements in pressure compensation technology, in combination with a low profile flat emitter, allows for excellent uniformity in applications with longer lengths of run and undulating terrain.



Raised inlets ensure that sediment deposits at the bottom of the tube do not enter the emitter.



Streamlined nature of the emitter encourages debris to pass by rather than enter the inlets.



Anti-siphon feature reduces susceptibility to the back siphoning.

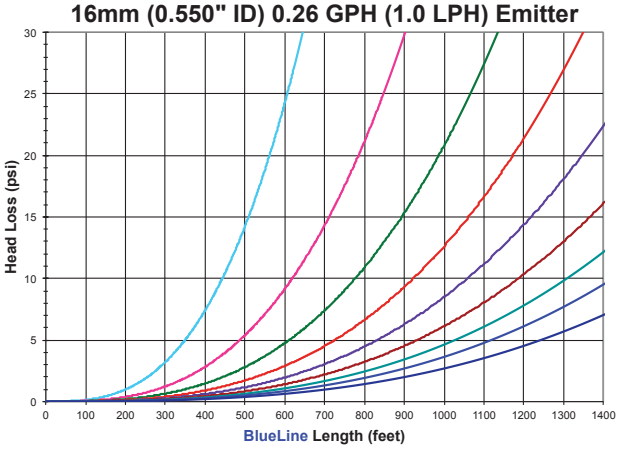
BlueLine® PC

Premium Pressure Compensating Dripline

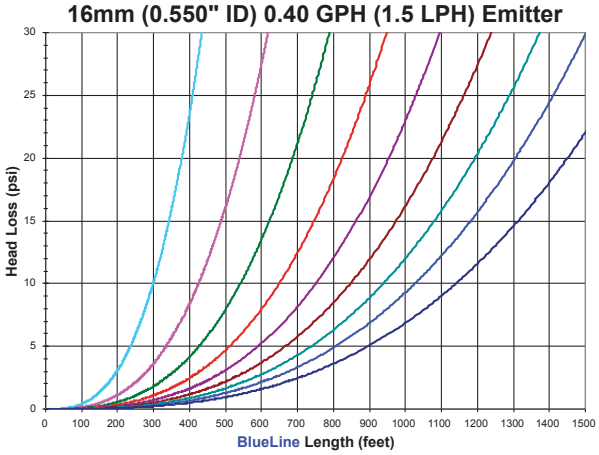
Spacings: 12" 18" 24" 30" 36" 42" 48" 54" 60"

0.550" (16MM) BLUELINE PC DRIPLINE

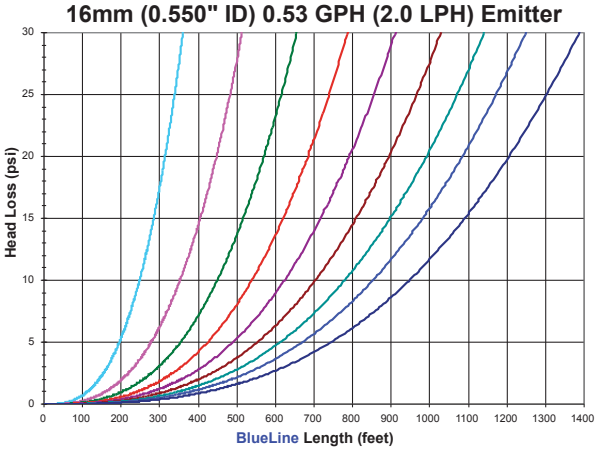
Head Loss v. Length with 0% Slope.
16mm (0.550" ID) 0.26 GPH (1.0 LPH) Emitter



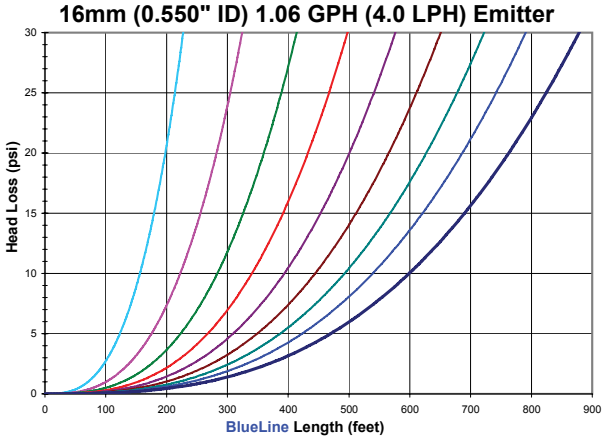
Head Loss v. Length with 0% Slope.
16mm (0.550" ID) 0.40 GPH (1.5 LPH) Emitter



Head Loss v. Length with 0% Slope.
16mm (0.550" ID) 0.53 GPH (2.0 LPH) Emitter

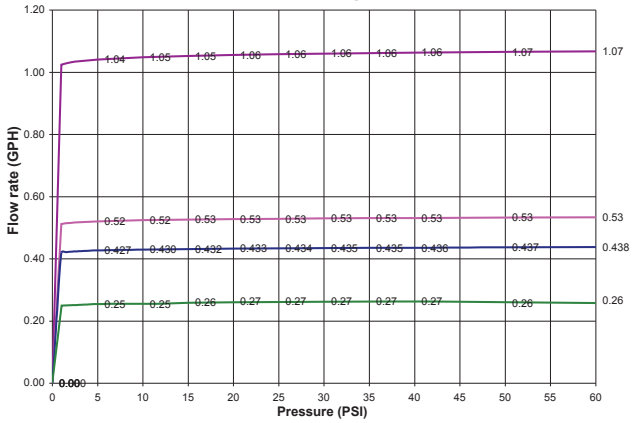


Head Loss v. Length with 0% Slope.
16mm (0.550" ID) 1.06 GPH (4.0 LPH) Emitter



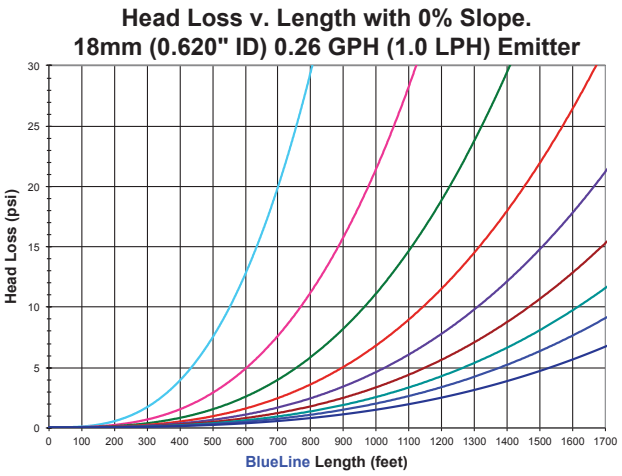
Specification	English Units	Metric Units
Hose nominal ID:	0.550"	16mm
Hose nominal wall"	0.045"	1.14mm
Nominal flow rate (Q): @ 30 psi (2bar)	0.26, 0.40, 0.53 & 1.06 gph	1.0, 1.5, 2.0 & 4 lph
Operation pressure range (P):	10 to 60 psi	0.69 to 4.14 bar
Coefficient of variation (Cv):	<3%	<3%
Barb loss factor (Kd):	0.8	0.8
Minimum filtration:	120 mesh (125 microns) for 0.40, 0.53, 1.06 gph 150 mesh (105 microns) for 0.26 gph	120 mesh (125 microns) for 0.40, 0.53, 1.06 gph 150 mesh (105 microns) for 0.26 gph

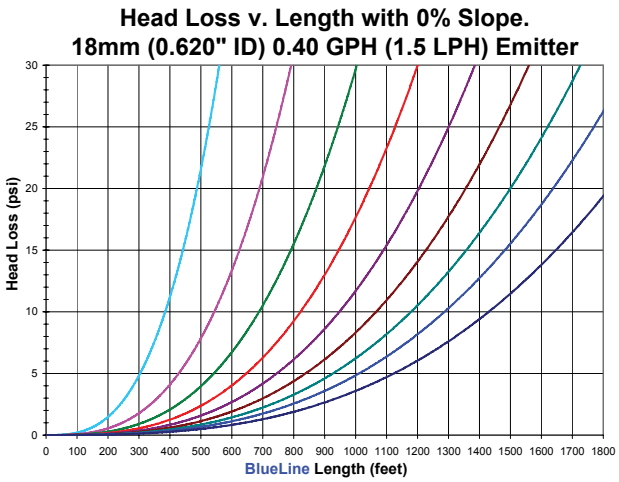
BlueLine Emitter Discharge Rate vs. Pressure

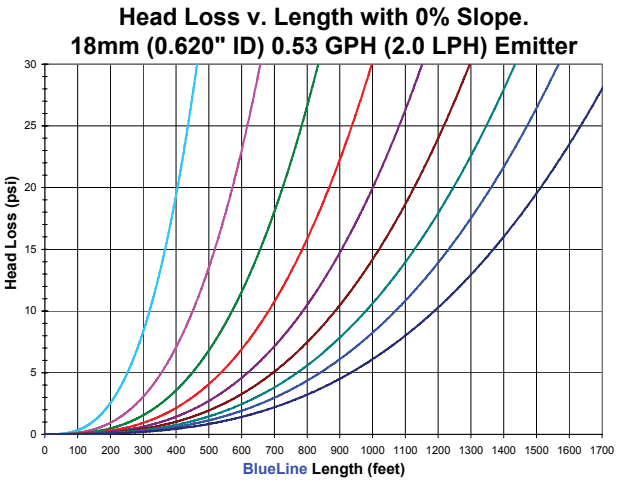


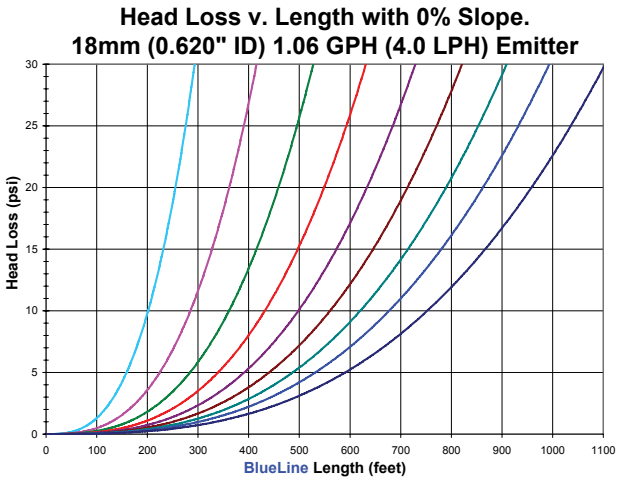
Spacings: 12" 18" 24" 30" 36" 42" 48" 54" 60"

0.620" (18MM) BLUELINE PC DRIPLINE

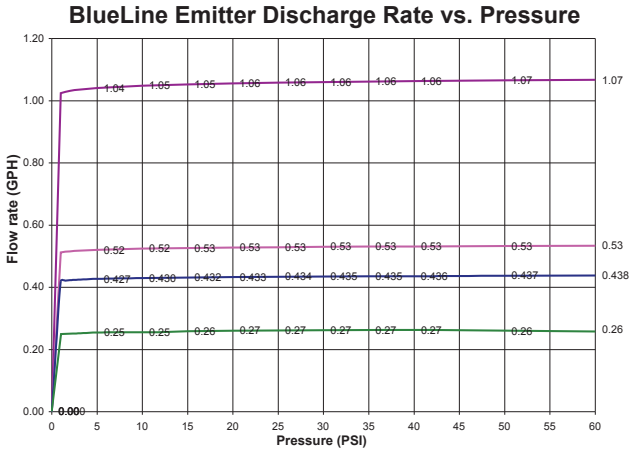








Specification	English Units	Metric Units
Hose nominal ID:	0.620"	18mm
Hose nominal wall"	0.045"	1.14mm
Nominal flow rate (Q): @ 30 psi (2bar)	0.26, 0.40, 0.53 & 1.06 gph	1.0, 1.5, 2.0 & 4 lph
Operation pressure range (P):	10 to 60 psi	0.69 to 4.14 bar
Coefficient of variation (Cv):	<3%	<3%
Barb loss factor (Kd):	0.64	0.64
Minimum filtration:	120 mesh (125 microns) for 0.40, 0.53, 1.06 gph 150 mesh (105 microns) for 0.26 gph	120 mesh (125 microns) for 0.40, 0.53, 1.06 gph 150 mesh (105 microns) for 0.26 gph

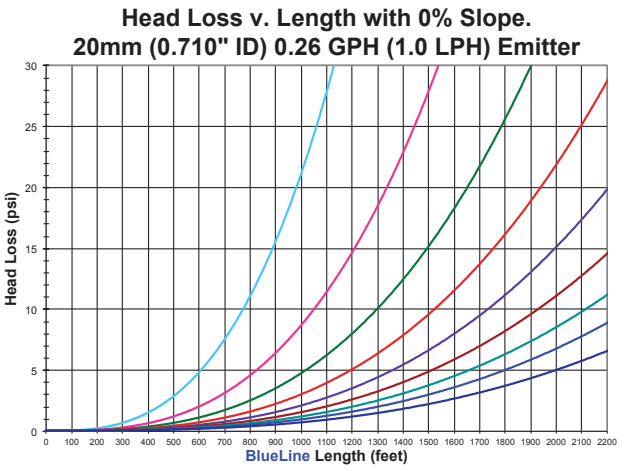


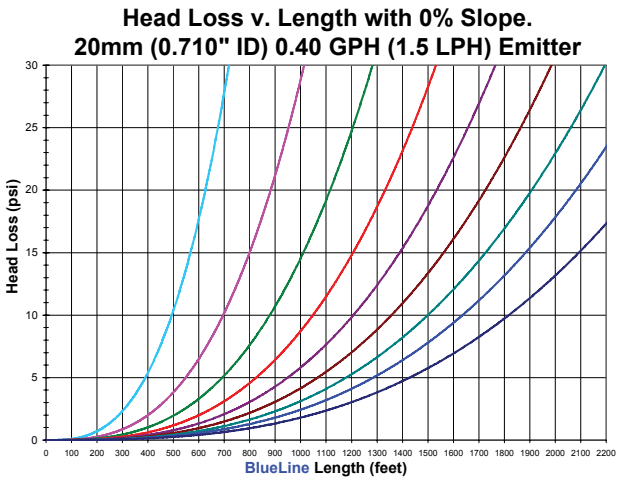
BlueLine® PC

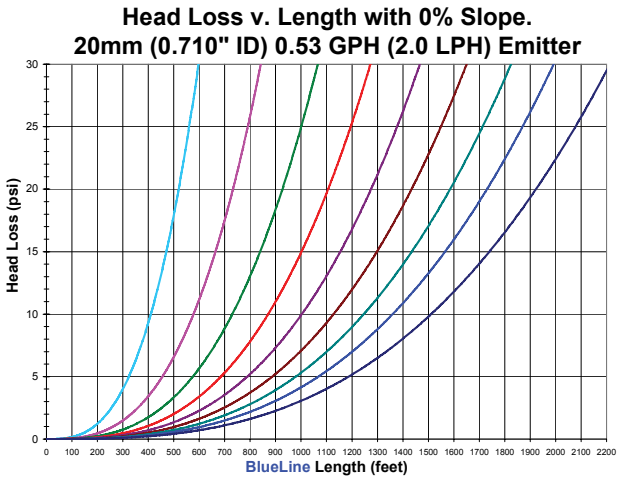
Premium Pressure Compensating Dripline

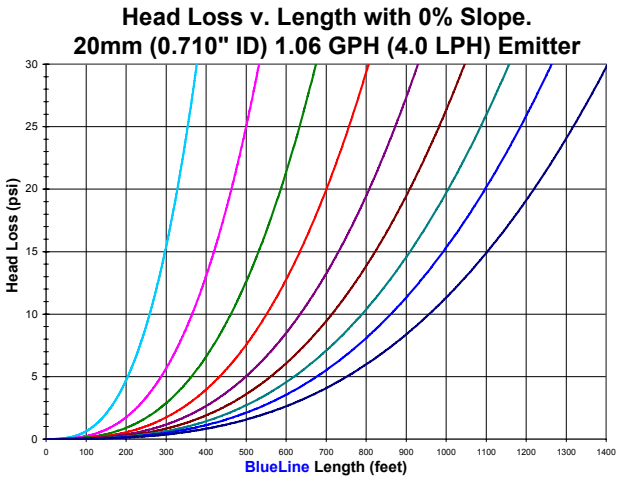
Spacings: 12" 18" 24" 30" 36" 42" 48" 54" 60"

0.710" (20MM) BLUELINE PC DRIPLINE

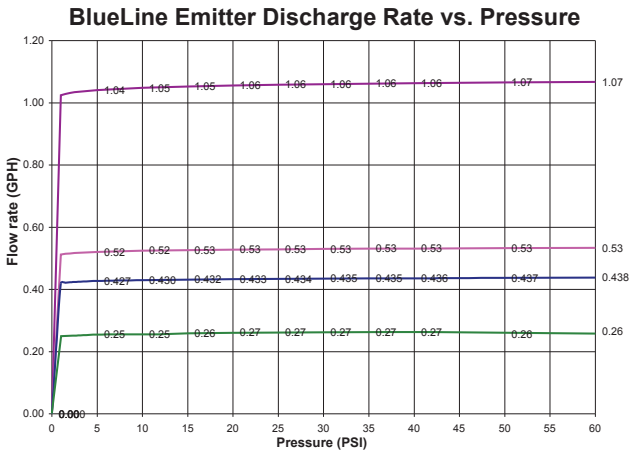








Specification	English Units	Metric Units
Hose nominal ID:	0.710"	20mm
Hose nominal wall"	0.048"	1.22mm
Nominal flow rate (Q): @ 30 psi (2bar)	0.26, 0.40, 0.53 & 1.06 gph	1.0, 1.5, 2.0 & 4 lph
Operation pressure range (P):	10 to 60 psi	0.69 to 4.14 bar
Coefficient of variation (Cv):	<3%	<3%
Barb loss factor (Kd):	0.27	0.27
Minimum filtration:	120 mesh (125 microns) for 0.40, 0.53, 1.06 gph 150 mesh (105 microns) for 0.26 gph	120 mesh (125 microns) for 0.40, 0.53, 1.06 gph 150 mesh (105 microns) for 0.26 gph



BlueLine® Classic

Premium Dripline

The BlueLine Classic dripline features an innovative emitter design that provides superior field performance in the most extreme conditions. Coupled with Toro's Blue Stripe® hose, the industry standard against which all other hose is measured, Blueline Classic provides performance, durability and economy. For the best in both emitter and hose technology in permanent crop applications, Toro BlueLine Classic is the best choice.

FEATURES & BENEFITS

Efficient Emitter Design
The unique "shark tooth" emitter flow path design allows uniform application of water and nutrients in demanding field applications, including long lengths of run or undulating terrain.

Accurate Flow Rate Between 5 and 60 psi
A wide operating window means less waste and uniform application of fluids to all plants, even at system start up and shutdown.

Low Profile Emitter Design
Reduced friction loss saves energy and helps ensure uniform application of fluid to all plants.

Uniform Manufacturing Platform
State of the art injection molding technology yields an "industry best" manufacturing coefficient of variation (Cv) of less than 3%, helping to ensure uniform application of fluids to all plants.

Clogging Resistance
Raised emitter inlets dramatically reduce the amount of debris allowed to enter the emitter flowpath during operation.

The Blue Stripe of Quality
The Blue Stripe marker aids in emitter location during installation and operation.

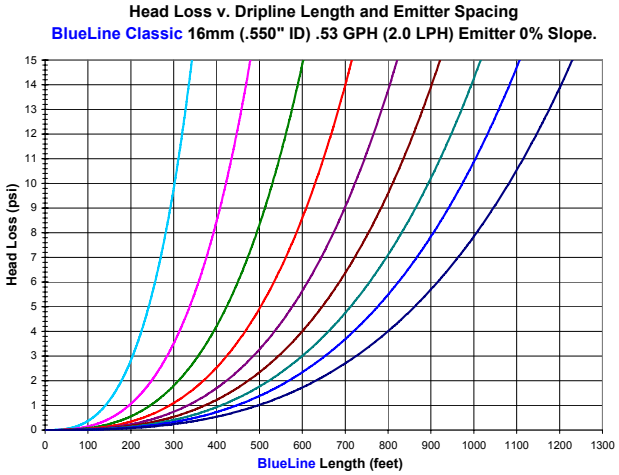
Blueline® Clipperline® Option
Factory installed clips reduce labor costs and installation time, and allow control of water droplet placement.

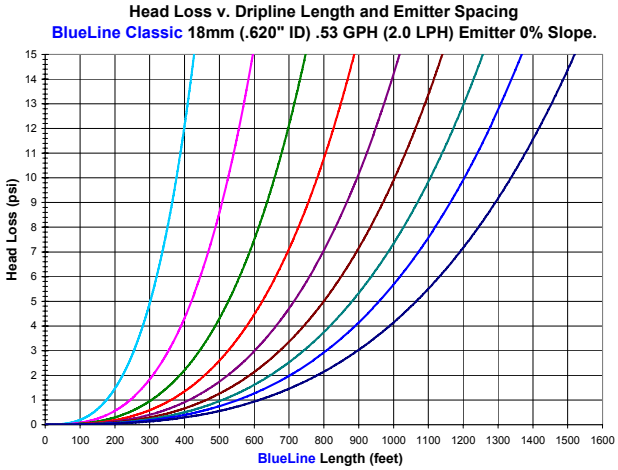
BlueLine® Classic

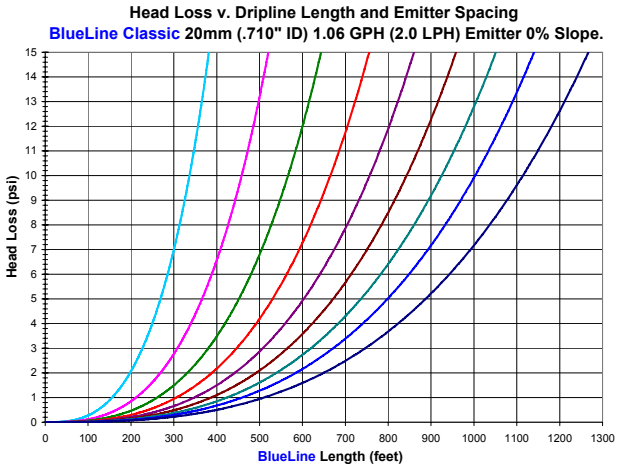
Premium Dripline

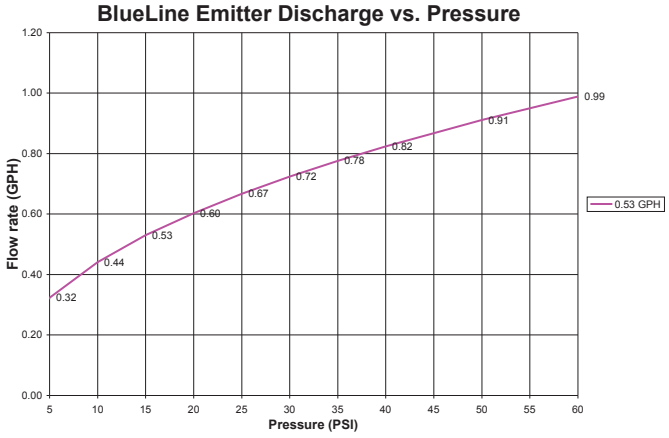
Spacings: 12" 18" 24" 30" 36" 42" 48" 54" 60"

0.53 GPH BLUELINE CLASSIC DRIPLINE





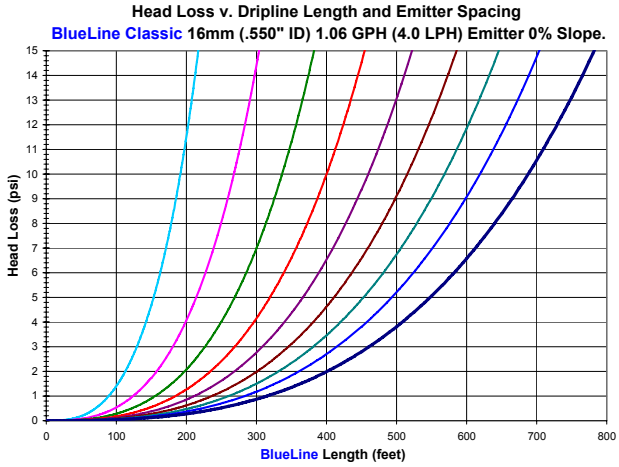


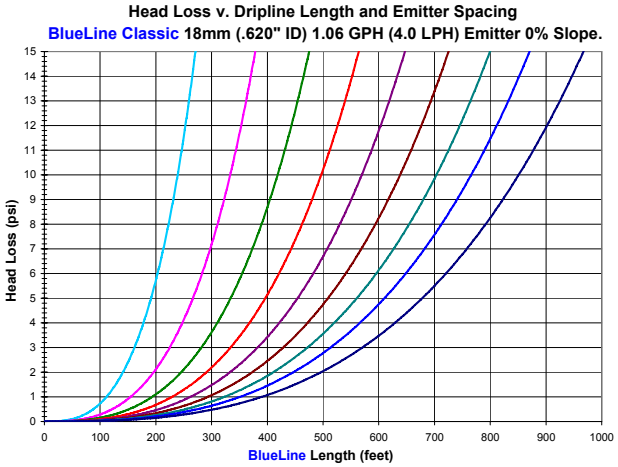


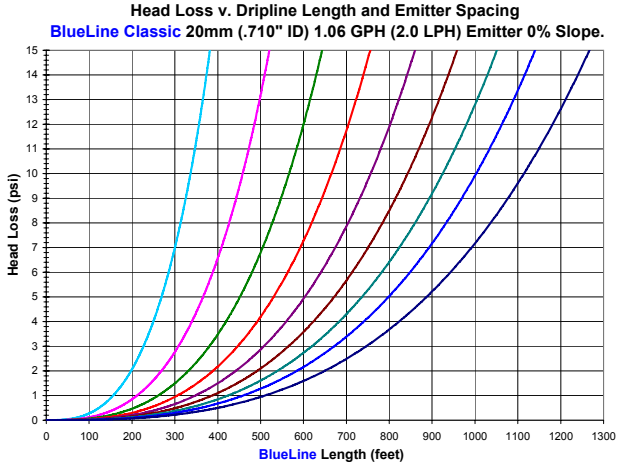
Hose nominal ID:	16mm (.550")	18mm (.620")	20mm (.710")
Hose nominal Wall:	0.045	0.045"	0.047"
Nominal flow rate (Q): @ 15 psi (1bar)	0.53 gph (2 L/h)		
Operation pressure range (P):	5 to 60 psi (0.7 to 4.1 bar)		
Emitter Exponent (x):	0.45		
Emitter Coefficient (K):	0.1567		
Coefficient of variation (Cv):	<3%		
Barb loss factor (Kd):	0.8	0.64	0.27
Minimum filtration:	120 mesh (120 microns)		

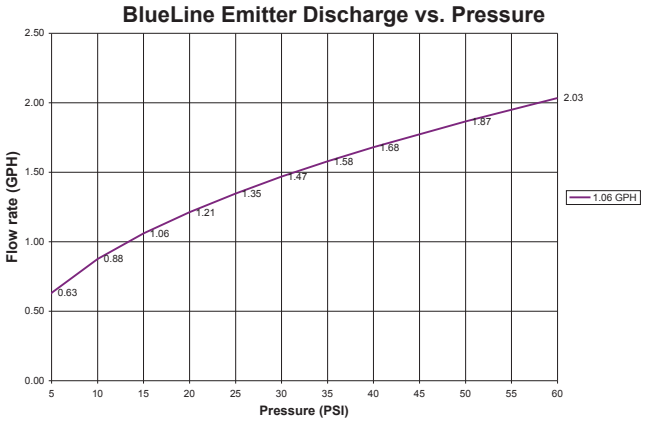
Spacings: 12" 18" 24" 30" 36" 42" 48" 54" 60"

1.06 GPH BLUELINE CLASSIC DRIPLINE









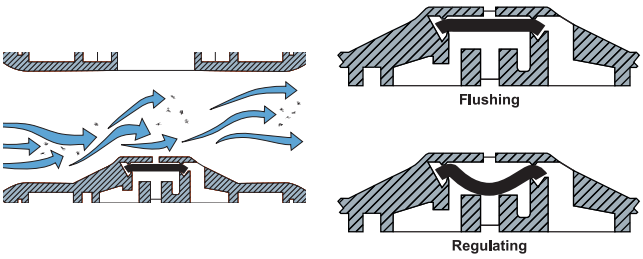
Hose nominal ID:	16mm (.550")	18mm (.620")	20mm (.710")
Hose nominal Wall:	0.045	0.045"	0.047"
Nominal flow rate (Q): @ 15 psi (1bar)	1.06gph (4 L/h)		
Operation pressure range (P):	5 to 60 psi (0.7 to 4.1 bar)		
Emitter Exponent (x):	0.47		
Emitter Coefficient (K):	0.2969		
Coefficient of variation (Cv):	<3%		
Barb loss factor (Kd):	0.8	0.64	0.27
Minimum filtration:	120 mesh (125 microns)		

Drip In® PC

Pressure Compensating Dripline

A technologically superior and cost effective way to irrigate

- Difficult topographical conditions
- Low and varying water pressures
- Installations requiring longer lateral runs



FEATURES & BENEFITS

Highly clog resistant
Due to wide, deep turbulent passageways and raised inlets.

Extremely accurate flow rate
Due to high quality control standards.

Reduced labor and installation cost
No hole punching, lost emitters or handling damage. Emitters are factory spaced.

Can't separate
Because there are no clip-ons or connections.

Lower friction loss
Due to jointless design, allows longer runs and fewer mainlines.

Versatility
Flow rates available in three hose sizes:
0.550" (16mm), 0.620" (18mm) and 0.710" (20mm)

DESIGN ADVANTAGES

High Resistance to Plugging
Water enters the emitter through a raised filtration system. Debris is deflected upward and away from the inlet. This feature significantly reduces the amount of debris entering the emitter when the system is operating. The positioning of the raised inlet also prevents sediment from collecting near the inlet while the system is not operating, and being ingested into the emitter at start-up. The emitters filter ensures that only particles smaller than the emitters cross sectional dimensions will enter.

Three flushing cycles to ensure reliability and performance.

1. **Pre-regulating Flush:**
   The automatic flushing feature is activated at low pressures during system startup. The diaphragm is relaxed allowing particles to be freely flushed out.
2. **Irrigation Flush:**
   During the irrigation cycle the diaphragm is depressed across the compensating chamber. If the emitter begins to clog, there is a reduction of flow, and pressure on both sides of the diaphragm begins to equalize. The diaphragm returns to its relaxed position and particles are flushed out. The dripper returns to normal performance.
3. **Shut-down Flush:**
   As pressure is reduced, the diaphragm returns to its relaxed position allowing accumulated particles to be flushed out.

Wide Compensating Range
At low pressures, 10 - 15 psi, the emitter behaves like a turbulent-flow emitter. From 15 - 60 psi, the emitter is fully pressure compensating.
Flat discharge curve over a wide range of pressures (10-60 PSI)

Chemical Resistance
The emitter body is made from injection molded polyethylene resins. The diaphragm is made from silicon. This combination will withstand acids down to pH2 as well as most commonly used ag chemicals, fertilizers and chlorine.

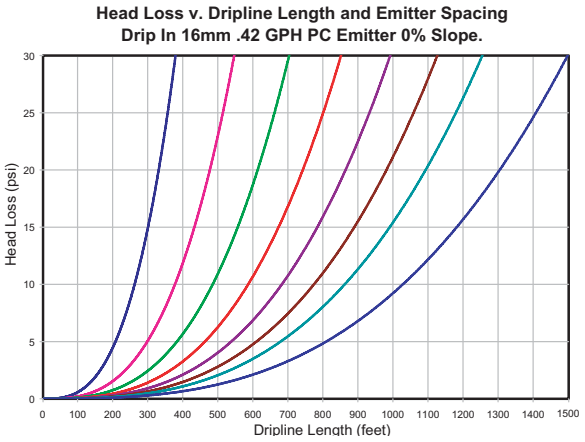
Uniformity
Drip In emitters have Cv values less than .05, one of the highest rankings of all manufacturers.

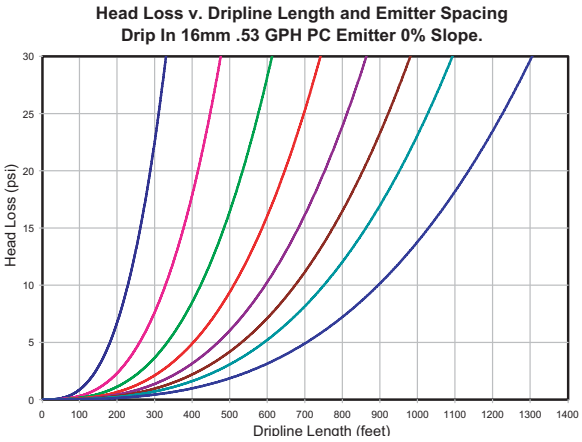
The In-line Emitter
is enclosed and inseparably welded to the inside wall of the tubing as it is extruded in the manufacturing process.

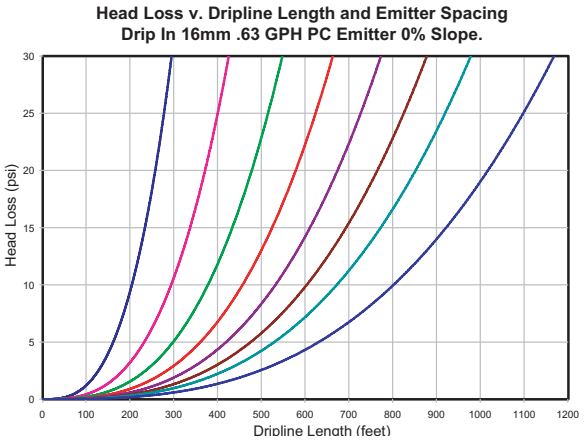
Pressure Compensating Dripline
A one piece, jointless emitter enclosed tube. It is rugged, lightweight and very flexible. It can be laid out and re-rolled easily with no damage to the inline emitter.

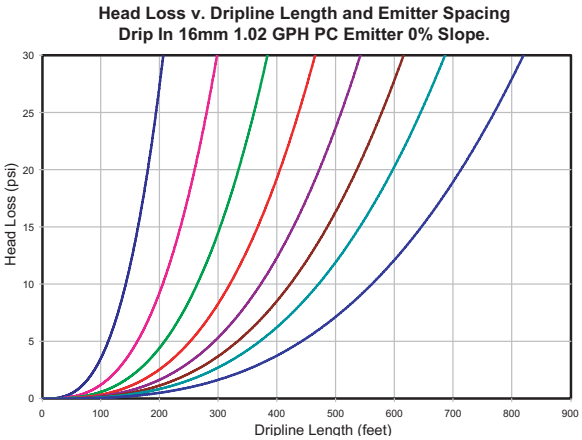
Spacings: 12" 18" 24" 30" 36" 42" 48" 54" 60"

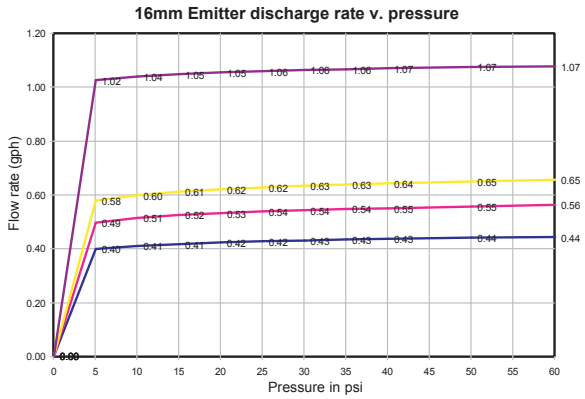
0.550 (16MM) DRIP IN PC DRIPLINE











16mm Drip In PC – Maximum Recommended Dripline Length (Feet) (0.550" I.D./0.640" O.D./0.045" Wall)

Inlet Pressure	Dripping Spacing																							
	12"				18"				24"				36"				42"				48"			
15 psi	199	174	156	115	286	250	224	165	366	321	287	211	513	449	402	296	581	509	456	335	649	566	507	373
25 psi	297	260	233	171	426	373	334	246	546	478	428	315	766	670	600	442	867	759	680	500	964	844	756	556
35 psi	358	313	280	206	513	449	402	296	658	576	516	379	922	807	723	532	1044	914	819	602	1161	1016	910	670
45 psi	404	354	317	233	585	508	455	335	743	651	583	429	1042	912	817	601	1180	1033	925	681	1312	1149	1029	757
Dripper Flow Rate (gph)	0.42	0.53	0.63	1.02	0.42	0.53	0.63	1.02	0.42	0.53	0.63	1.02	0.42	0.53	0.63	1.02	0.42	0.53	0.63	1.02	0.42	0.53	0.63	1.02

Maxiumum length of run based on EU and minimum pressures – please contact Toro for length of run based on other criteria such as flushing velocity.

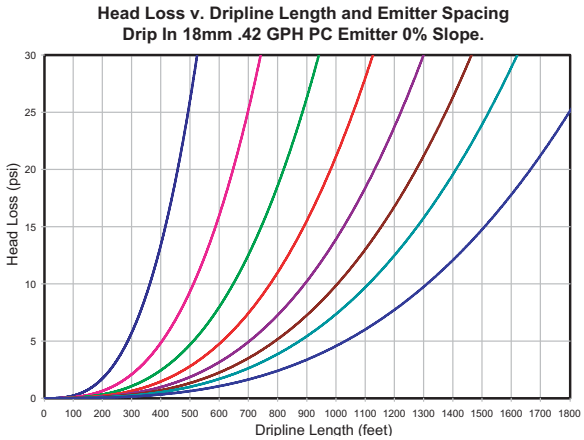
Barb Loss Factor (kd) 2.07 Coefficient pf variation < 5%

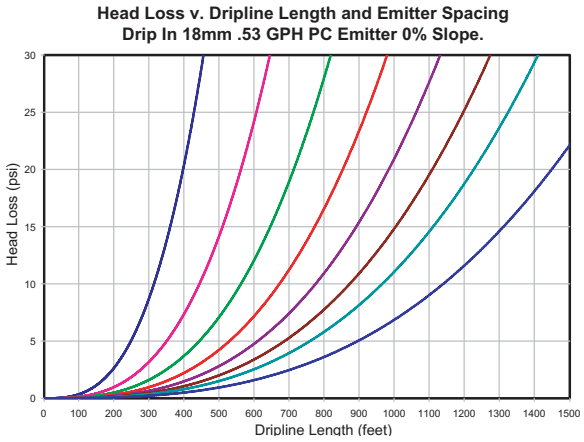
Drip In® PC

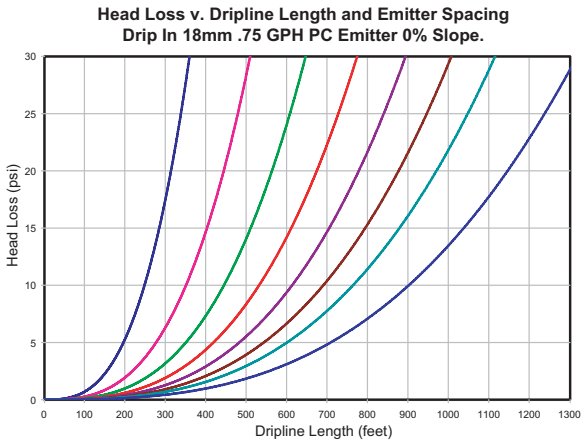
Pressure Compensating Dripline

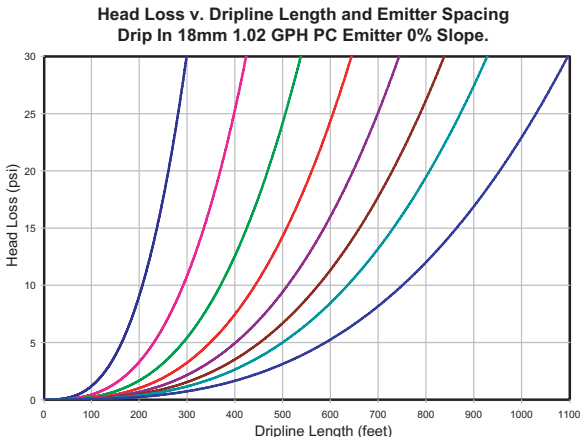
Spacings: 12" 18" 24" 30" 36" 42" 48" 60"

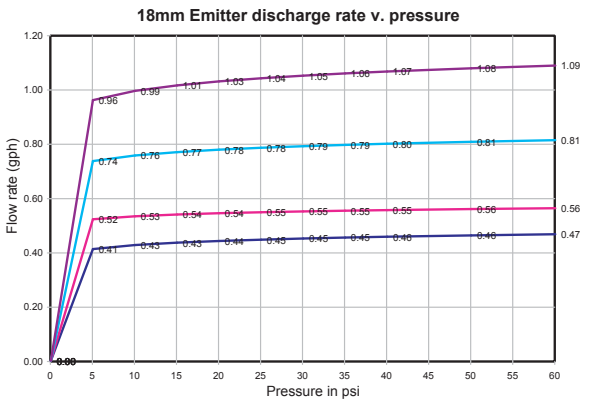
0.620 (18MM) DRIP IN PC DRIPLINE











18mm Drip In PC – Maximum Recommended Dripline Length (Feet) (0.620" I.D./0.710" O.D./0.045" Wall)

Inlet Pressure	Dripping Spacing																							
	12"				18"				24"				36"				42"				48"			
15 psi	271	238	190	157	384	336	270	222	488	427	342	281	673	589	473	388	758	664	532	438	839	735	589	484
25 psi	405	354	284	234	573	502	102	331	727	637	510	420	1004	879	705	579	1131	990	794	653	1252	1096	878	722
35 psi	488	427	4342	281	690	604	484	398	876	767	615	505	1210	1059	849	698	1362	1193	956	786	1508	1320	1058	870
45 psi	551	482	387	318	780	683	548	450	990	867	695	571	1367	1197	959	789	1540	1348	1088	888	1704	1492	1196	983
Dripper Flow Rate (gph)	0.42	0.53	0.75	1.02	0.42	0.53	0.75	1.02	0.42	0.53	0.75	1.02	0.42	0.53	0.75	1.02	0.42	0.53	0.75	1.02	0.42	0.53	0.75	1.02

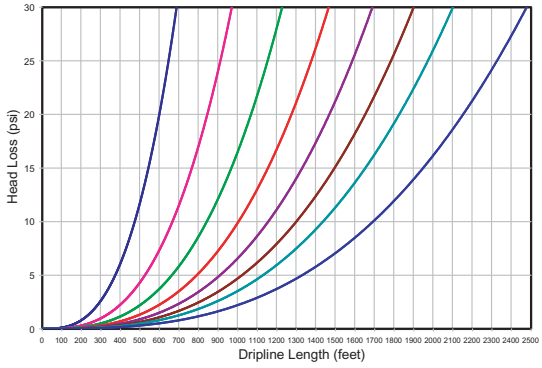
Maxiumum length of run based on EU and minimum pressures – please contact Toro for length of run based on other criteria such as flushing velocity.

Barb Loss Factor (kd) 0.98 Coefficient pf variation < 5%_

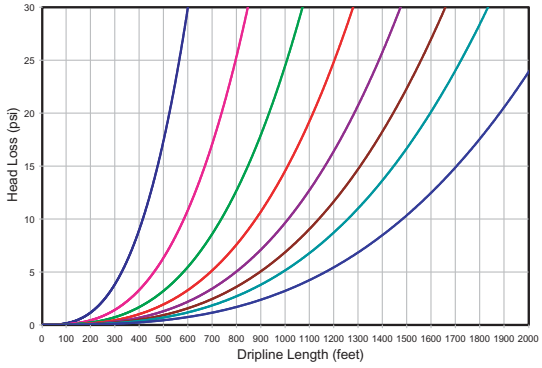
Spacings: 12" 18" 24" 30" 36" 42" 48" 60"

0.710 (20MM) DRIP IN PC DRIPLINE

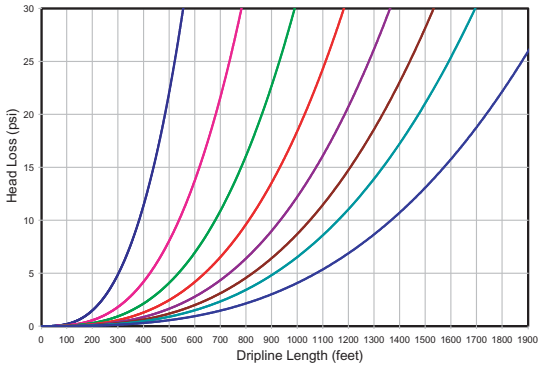
Head Loss v. Dripline Length and Emitter Spacing
Drip In 20mm .42 GPH PC Emitter 0% Slope.



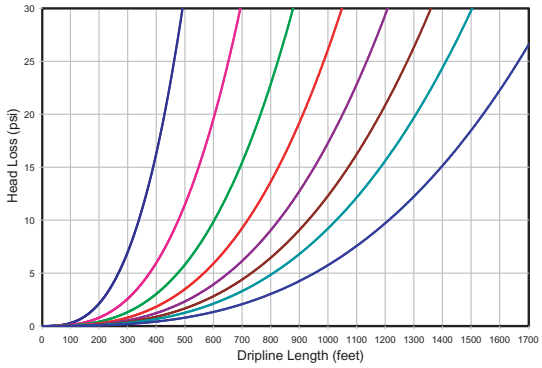
Head Loss v. Dripline Length and Emitter Spacing
Drip In 20mm .53 GPH PC Emitter 0% Slope.



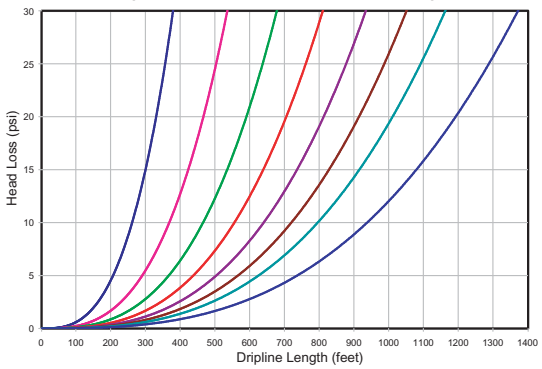
Head Loss v. Dripline Length and Emitter Spacing
Drip In 20mm .63 GPH PC Emitter 0% Slope.



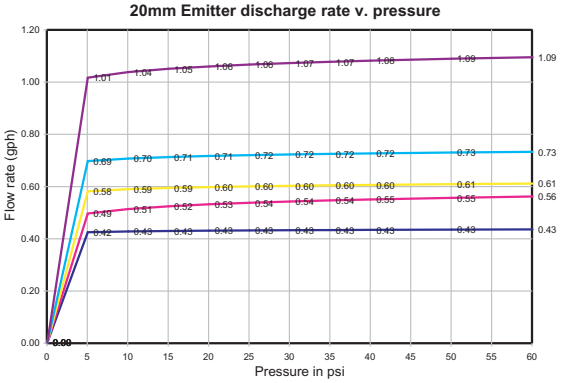
Head Loss v. Dripline Length and Emitter Spacing
Drip In 20mm .75 GPH PC Emitter 0% Slope.



Head Loss v. Dripline Length and Emitter Spacing
Drip In 20mm 1.02 GPH PC Emitter 0% Slope.



20mm Emitter discharge rate v. pressure



20mm Drip In PC – Maximum Recommended Dripline Length (Feet) (0.710" I.D./0.805" O.D./0.047" Wall)

Inlet Pressure	Dripper Spacing																												
	12"					18"					24"					36"					42"					48"				
15 PSI	357	312	280	251	206	502	440	394	353	290	635	556	498	445	366	871	762	683	611	502	979	857	767	687	565	1081	947	848	759	624
25 PSI	532	466	418	374	307	749	656	588	526	432	947	829	742	664	546	1299	1137	1019	9122	749	1460	1278	1145	1024	842	1613	1412	1265	1132	930
35 PSI	614	561	503	450	370	903	790	708	633	521	1140	998	894	800	658	1588	1369	1227	1098	903	1758	1539	1379	1234	1014	1942	1700	1523	1363	1121
45 PSI	725	634	568	509	418	1020	893	800	716	589	1288	1128	1010	904	743	1795	1548	1387	1241	1020	1987	1740	1558	1394	1146	2195	1922	1721	1540	1267
Dripper Flow Rate (gph)	0.42	0.53	0.63	0.75	1.02	0.42	0.53	0.63	0.75	1.02	0.42	0.53	0.63	0.75	1.02	0.42	0.53	0.63	0.75	1.02	0.42	0.53	0.63	0.75	1.02	0.42	0.53	0.63	0.75	1.02

Maxiumum length of run based on EU and minimum pressures – please contact Toro for length of run based on other criteria such as flushing velocity.

Barb Loss Factor (kd) 0.75 Coefficient pf variation ≤ 5%

Drip In® Classic

Turbulent Flow Dripline

The Drip In® Emitter

Inserted in the tube...

becomes a permanent part of it.

Drip In Classic is the most effective and economical choice for most permanent applications. The hose with the integral in-line emitter is rugged and lightweight for easy installation and retrieval. The in-line emitter, with it's proven turbulent flow path design and raised inlets, offers high resistance to clogging for the most demanding of applications.

IMPROVED CROP YIELD AND QUALITY

- Water distributed evenly over all rows in the irrigated area.
- Fewer weeds from surface water.
- Precise application of fertilizers.
- Better control of plant stress.
- Harvest timing becomes controllable.
- Crops can be irrigated during harvesting to maximize total yield.

CULTURAL COST BENEFITS

- Less irrigation water applied during growing season.
- Quantity of fertilizers can be reduced.
- Reduced labor costs for irrigation and harvesting.

THE IN-LINE EMITTER

- The in-line emitter is a labyrinth type, turbulent flow dripper. The emitter is enclosed and inseparably welded to the inside wall of the tubing as it is extruded in the manufacturing process. This emitter has enjoyed over 20 years of reliable performance in a variety of applications.
- Classic® Dripline is a one piece emitter enclosed tube. It is rugged, lightweight and very flexible. It can be laid out and re-rolled easily with no damage to the in-line emitters. Only the highest quality resins are used. Drip In® dripline is the most effective and economical choice for permanent or row crops. Classic dripline now comes with the Toro Micro-Irrigation Blue Stripe® of quality.

ADVANTAGES

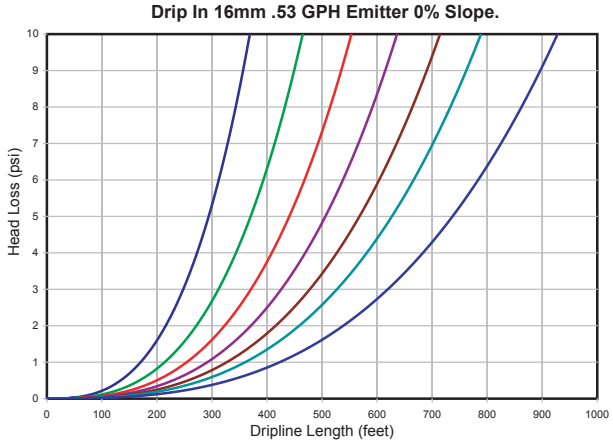
- Highly clog-resistant due to wide, deep turbulent passage ways and raised inlets.
- Dual-opposed outlets.
- Extremely accurate flow rate due to high quality control standards.
- Reduced labor and installation cost. No hole punching, lost emitters or handling damage.
- Lower friction loss allows longer runs and fewer mainlines.
- Flow rate can be varied according to crop requirements.
- For above and below ground applications.*
- Emitters are factory pre-installed, thus requiring no field installation (hole punching, clip-ons, etc.).

Note: For subsurface applications, we recommend Drip In® with Rootguard®.

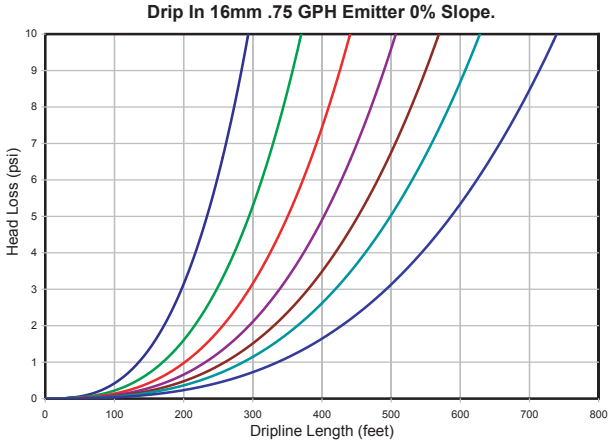
Spacings: 18" 24" 30" 36" 42" 48" 60"

0.550 (16MM) DRIP IN CLASSIC DRIPLINE

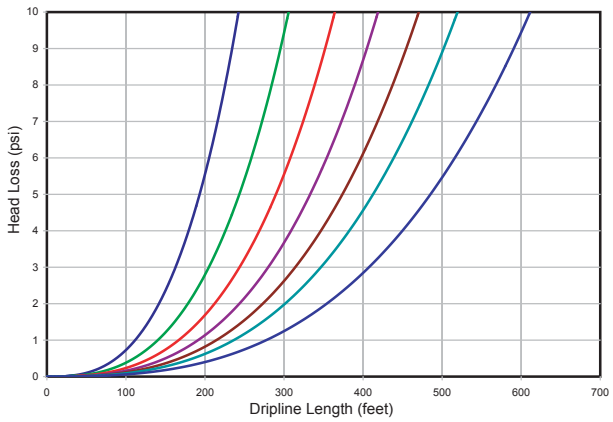
Head Loss v. Dripline Length and Emitter Spacing
Drip In 16mm .53 GPH Emitter 0% Slope.



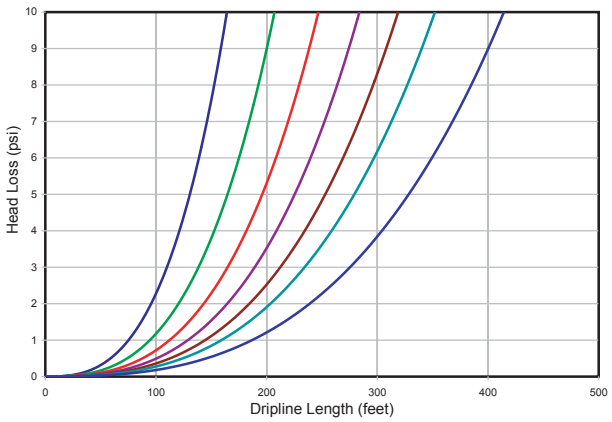
Head Loss v. Dripline Length and Emitter Spacing
Drip In 16mm .75 GPH Emitter 0% Slope.



Head Loss v. Dripline Length and Emitter Spacing
Drip In 16mm 1.0 GPH Emitter 0% Slope.



Head Loss v. Dripline Length and Emitter Spacing
Drip In 16mm 1.8 GPH Emitter 0% Slope.



		Flow Rate vs. Pressure						
Emitter Flow GPH @ 15 psi	Color of Emitter	Pressure (psi)						
		10	15	20	25	30	35	40
0.53	Black	0.43	0.53	0.62	0.69	0.76	0.82	0.88
0.75	Brown	0.61	0.75	0.87	0.97	1.06	1.15	1.22
1.00	Green	0.81	1.00	1.16	1.31	1.44	1.57	1.68
1.80	Blue	1.46	1.80	2.09	2.35	2.58	2.80	3.00

Color Coding of Emitter is as shown.

0.550" I.D./0.640" O.D./0.045" Wall		16mm Dripline Run Length							
Emitter Spacing		Maximum Run for a Flow Variation ±5%							
		0.53 gph	2.0 lph	0.75 gph	2.8 lph	1.0gph.	3.78 lph	1.80 gph	6.81 lph
Inches	Centimeters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters
18"	45	254	77	201	61	165	50	125	38
24"	60	317	97	254	77	205	62	150	46
30"	75	374	114	300	97	228	69	172	52
36"	90	428	130	345	105	270	82	205	62
42"	105	478	146	392	119	300	91	225	69
48"	125	526	160	428	130	330	101	250	76
60"	150	616	188	474	144	385	117	290	88

Maxiumum length of run based on EU and minimum pressures – please contact Toro for length of run based on other criteria such as flushing velocity.

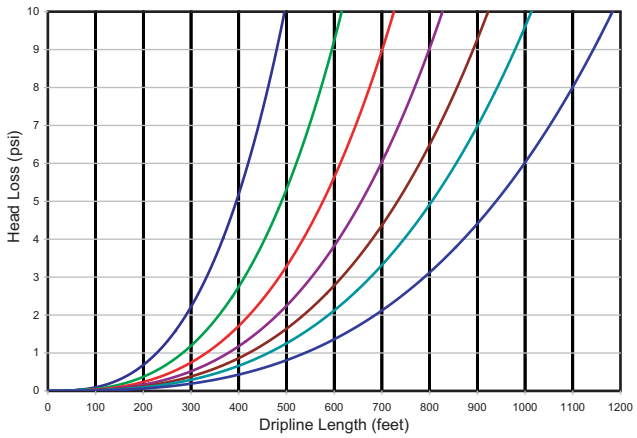
Drip In® Classic

Turbulent Flow Dripline

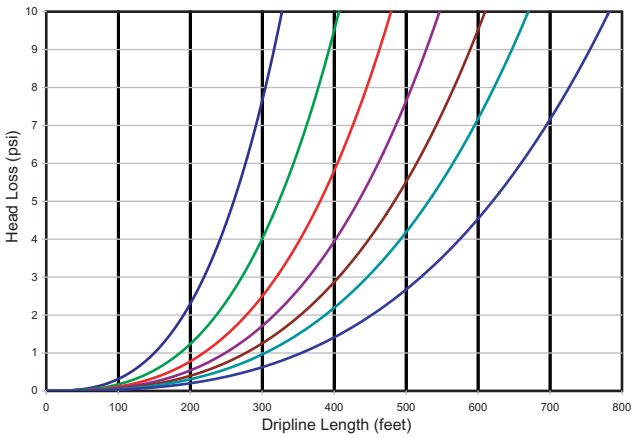
Spacings: 18" 24" 30" 36" 42" 48" 60"

0.620 (18MM) DRIP IN CLASSIC DRIPLINE

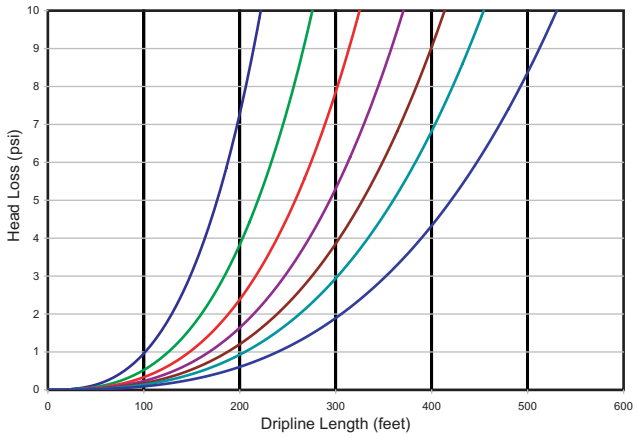
Head Loss v. Dripline Length and Emitter Spacing
Drip In 18mm .53 GPH Emitter 0% Slope.



Head Loss v. Dripline Length and Emitter Spacing
Drip In 18mm 1.0 GPH Emitter 0% Slope.



Head Loss v. Dripline Length and Emitter Spacing
Drip In 18mm 1.8 GPH Emitter 0% Slope.



Flow Rate vs. Pressure

Emitter Flow GPH @ 15 psi	Color of Emitter	Pressure (psi)						
		10	15	20	25	30	35	40
0.53	Black	0.43	0.53	0.62	0.69	0.76	0.82	0.88
1.00	Green	0.81	1.00	1.16	1.31	1.44	1.57	1.68
1.80	Blue	1.46	1.80	2.09	2.35	2.58	2.80	3.00

Color Coding of Emitter is as shown.

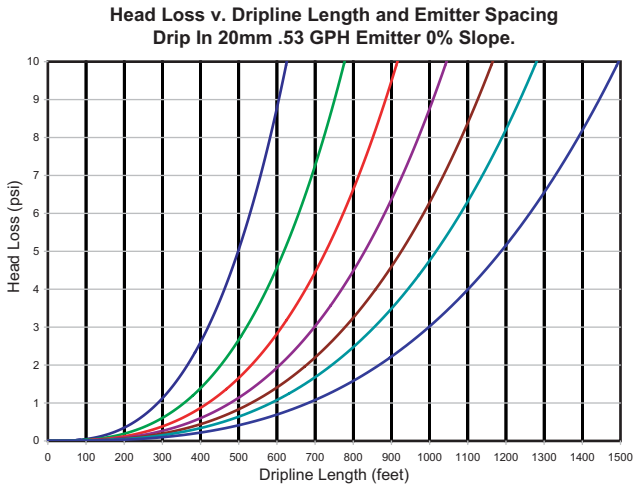
0.620" I.D./0.710" O.D./0.045" Wall — **18mm Dripline Run Length**

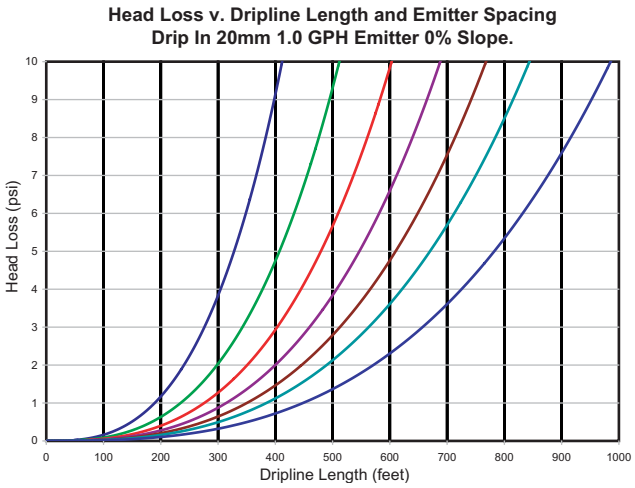
Emitter Spacing		Maximum Run for a Flow Variation ±5%					
		0.53 gph	2.0 lph	1.0gph.	3.78 lph	1.80 gph	6.81 lph
Inches	Centimeters	Feet	Meters	Feet	Meters	Feet	Meters
18"	45	330	101	225	69	151	46
24"	60	410	125	282	86	186	57
30"	75	460	140	322	98	217	66
36"	90	545	166	369	112	250	76
42"	105	620	189	410	125	276	84
48"	125	670	204	452	138	304	93
60"	150	775	236	524	160	355	108

Maxiumum length of run based on EU and minimum pressures – please contact Toro for length of run based on other criteria such as flushing velocity.

Spacings: 18" 24" 30" 36" 42" 48" 60"

0.710 (20MM) DRIP IN CLASSIC DRIPLINE





Flow Rate vs. Pressure								
Emitter Flow GPH @ 15 psi	Color of Emitter	Pressure (psi)						
		10	15	20	25	30	35	40
0.53	Brown	0.43	0.53	0.61	0.68	0.75	0.81	0.87
1.00	Green	0.81	1.00	1.16	1.31	1.44	1.57	1.68

Color Coding of Emitter is as shown.

0.710" I.D./0.805" O.D./0.045" Wall		20mm Dripline Run Length			
Emitter Spacing		Maximum Run for a Flow Variation ±5%			
		0.53 gph	2.0 lph	1.0 gph	3.78 lph
Inches	Centimeters	Feet	Meters	Feet	Meters
18"	45	395	120	271	83
24"	60	493	150	338	103
30"	75	582	177	397	121
36"	90	666	203	453	138
42"	105	744	227	507	155
48"	125	820	250	556	169
60"	150	958	292	170	170

Maxiumum length of run based on EU and minimum pressures – please contact Toro for length of run based on other criteria such as flushing velocity.

Drip In® Rootguard®

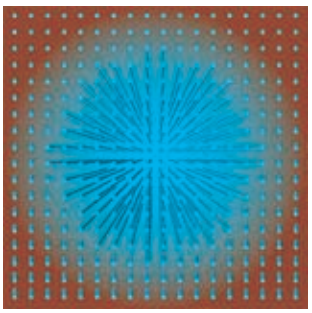
Drip In **ROOTGUARD** is the key to subsurface drip irrigation success. ROOTGUARD technology combines Treflan® with the drip emitter to inhibit root growth. This is patented technology by Geoflow, Inc. where the herbicide is released at a uniform rate over a long period of time. It maintains a sufficient concentration in the soil immediately surrounding the drip emitter, to prevent longitudinal rootgrowth into the dripper. Built-in ROOTGUARD protection is guaranteed for 10 years by Geoflow, Inc. to prevent roots from growing into these impregnated subsurface drip emitters.

ADVANTAGE

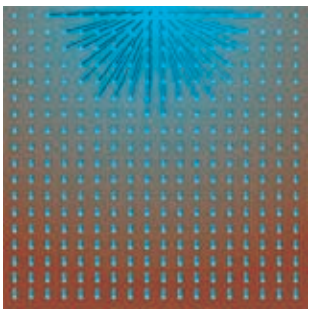
- **Higher Yields**
  Water and nutrients delivered directly to the root zone at regular short intervals, promote healthy plant growth and reduce stress
- **Substantial Water Savings**
  Improved irrigation system efficiency, combined with the ability to schedule short and frequent irrigation run time rates eliminate run-off as well as deep percolation
- **Healthier, Better Quality Crops**
  Soil surface and foliage is kept dry, reducing fungal diseases caused by moisture on the soil surface and resulting high humidity in the canopy
- **Further Water Savings**
  Water loss due to evaporation is eliminated.
- **Improved Soil Aeration**
  Fine soil particles are not washed down, decreasing soil compaction and thus improving root growth
- **Fewer Chemicals**
  Large volumes of irrigation water do not wash fungicides, insecticides and herbicides away
- **Fewer Weeds**
  A dry soil surface reduces germination
- **Longer Irrigation System Life**
  The system is a solid set subsurface system that eliminates any irrigation handling and subsequent damages
- **Available in both PC and Classic**

COMPARISON TABLE

Given the same amount of water, Subsurface Drip Irrigation Covers a 46% larger wetted volume of soil than a surface drip system. This decreases the saturation point of the soil, which not only leaves room for more air, but also improves the capillary movement of water and decreases the water lost to deep percolation.



Subsurface Drip



Surface Drip


Hose

Blue Stripe®

Polyethylene Round Hose

"Industry Best 7 Year Warranty"

Toro Micro-Irrigation Blue Stripe Round Hose is manufactured in the United States from premium grade linear-low density polyethylene resins. It is used in the most demanding agricultural and nursery micro-irrigation applications worldwide to reliably transport irrigation water and fertilizer to plants and crops. State of the art manufacturing specifications, methods and standards ensure each coil meets stringent quality control standards worthy of carrying the "Blue Stripe of Quality" trademark.

FEATURES & BENEFITS

BlueStripe hose
is manufactured from the highest grades of polyethylene resins for durability and reliability.

Available in a wide range of diameters, wall thicknesses and coil lengths
to accommodate required lengths of run, working pressures and terrain.

Available in blue, white or purple stripes
for easy irrigation zone identification.

Available in white tubing for nursery and extreme climate applications
to assist with water temperature control.

ID control is standard,
but OD controlled configurations are available as well.

A minimum of 2% carbon black is present
to prevent ultraviolet light degradation.

State of the art quality control standards and processes ensure consistent high quality production 24/7.

Blue Stripe® Clipper Hose
provides factory pre-installed clips which dramatically reduces labor costs and installation time, and directs the placement of water.

7 year warranty
is the strongest in the industry, and backed by industry professionals who care.

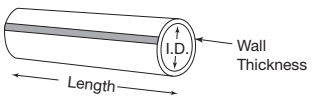
BLUE STRIPE ROUND HOSE

ID Controlled Hose

Part Number	Nominal Hose Size				Pressure Rating (PSI)	Nominal Weight (lbs) Per 100′	Packaging Options							Stripe Colors Available		
	ID mm	ID Inches	ID Inch	Wall Inch			100′	250′	300′	500′	660′	1000′	3000′	Blue	White	Purple
Blue Stripe® Round Hose - Coil Strapped																
EHD0437-xxx	4	1/4	0.170	0.040	167	1.9	•						•	•		
EHD1035-xxx	10	-	0.390	0.035	73	1.9				•		•		•		
EHD1038-xxx	10	-	0.375	0.038	81	2.0				•		•		•		
EHD1335-xxx	13	1/2	0.510	0.035	57	2.4				•		•		•		
EHD1348-xxx	13	1/2	0.510	0.048	76	3.4				•		•		•		
EHD1350-xxx	13	1/2	0.520	0.050	78	3.6				•		•		•		
EHD1443-xxx	14	-	0.550	0.043	64	3.2				•		•		•		
EHD1554-xxx	15	-	0.570	0.054	77	4.3				•		•		•		
EHD1635-xxx	16	5/8	0.615	0.035	48	2.9				•		•		•		
EHD1642-xxx	16	5/8	0.625	0.042	56	3.6				•		•		•		
EHD1643-xxx	16	5/8	0.620	0.043	58	3.7				•		•		•		
EHD1645-xxx	16	5/8	0.615	0.045	61	3.8				•		•		•	•	•
EHD1845-xxx	18	-	0.710	0.045	53	4.3				•		•		•		
EHD1847-xxx	18	-	0.730	0.047	54	4.6				•		•		•		
EHD1850-xxx	18	-	0.720	0.050	58	4.9				•		•		•		
EHD2052-xxx	20	3/4	0.805	0.052	54	5.7				•		•		•	•	•
EHD2057-xxx	20	3/4	0.805	0.057	59	6.2				•		•		•	•	•
EHD2657-xxx	26	1	1.060	0.057	46	8.1				•	•			•		
EHD2662-xxx	26	1	1.060	0.062	49	8.8				•	•			•	•	•
EHD2667-xxx	26	1	1.060	0.067	53	9.6				•	•			•	•	•
EHD3580-xxx	35	1 1/4	1.365	0.080	49	14.7			•					•		
Blue Stripe® Round Hose - Stretch Wrapped																
EHW0437-xxx	4	1/4	0.170	0.040	167	1.9						•		•		
EHW0645-xxx	6	3/8	0.250	0.047	139	1.9				•				•		
EHW1554-xxx	15	-	0.570	0.054	77	4.5	•			•						
EHW1645-xxx	16	5/8	0.615	0.045	61	4.0	•			•						
Colored Round Hose - Coil Strapped																
White Tubing																
WHD1645-xxx	16	5/8	0.615	0.045	61	3.8				•		•		•	•	•
WHD2057-xxx	20	3/4	0.805	0.057	59	6.3				•		•		•	•	•
WHD2667-xxx	26	1	1.060	0.067	53	9.6		•		•	•			•	•	•
Purple Tubing																
PHD1645-xxx	16	5/8	0.615	0.045	61	3.8				•		•		•	•	•
Brown Tubing																
BHD1645-xxx	16	5/8	0.615	0.045	61	3.8				•		•		•	•	•

OD Controlled Hose

Part Number	Nominal Hose Size				Pressure Rating (PSI)	Nominal Weight (lbs) Per 100′	Packaging Options						Stripe Colors Available		
	ID mm	ID Inches	ID	Wall Inch			100′	250′	300′	500′	660′	1000′	Blue	White	Purple
Blue Stripe® Round Hose - Coil Strapped															
EHO1650-xxx	16	5/8	0.600	0.050	68	4.1				•		•	•		
EHO2050-xxx	20	3/4	0.830	0.050	51	5.6				•		•	•		
EHO2055-xxx	20	3/4	0.830	0.055	55	6.2				•		•	•		
Blue Stripe® Round Hose - Stretch Strapped															
EHW1650-xxx	16	5/8	0.600	0.050	68	4.1	•			•			•		
Colored Round Hose - Coil Strapped															
White Tubing															
WHO1650-xxx	16	5/8	0.600	0.050	68	4.1				•		•	•		



Part Number: EHD 16 45 - 100

- 16 — Inside diameter (I.D.) in mm.
- 45 — Nominal wall thickness in 1/1000".
- 100 — Reel Length: multiply by 10 to obtain in feet.

Hose without a stripe or with other coil lengths/packaging are available upon request as a Custom Made Product. Please consult with your Toro Micro-Irrigation representative for availability and minimum requirements.

Blue Stripe®

Oval Hose

Toro Micro Irrigation Blue Stripe Oval Hose is manufactured in the United States from premium grade polyethylene resins for tough, dependable operation in the most rigorous agricultural micro-irrigation applications. Small diameter models of Oval Hose may be used as lateral lines in permanent crop applications, while large diameter models may be used as submains and mainlines in row crop applications. The unique, flattened shape of Oval Hose reduces storage space and shipping costs, and lends itself to much easier portability than rigid PVC pipelines.

FEATURES & BENEFITS

Blue Stripe Oval Hose
Is manufactured from the highest grades of polyethylene resins for reliability and durability

Larger diameters
Provide a cost effective alternative to both rigid and flexible PVC pipelines

Freight savings
For up to 50% due to its unique, flattened configuration

Available in a wide range
Of diameters, coil lengths, and wall thicknesses to accommodate most working pressures, terrains and lengths of run

A minimum of 2% carbon black
Is present to prevent ultraviolet degradation and maximize long term service

State of the art quality control standards
Processes ensure consistent, high quality production that meets engineering specifications for durability, longevity and compatibility with mating fittings

The Blue Stripe of Quality Trademark
Is backed by Toro, the most trusted name in Micro-Irrigation

Industry best warranty
7 years for the 42 psi rated models and 2 years for the 21 psi rated models

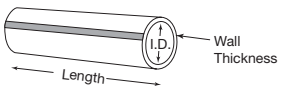
BLUE STRIPE OVAL HOSE

21 psi Working Pressure												
Part Number	Hose Size		Nominal Hose Size		Coil Length		Nominal Weight		Coil Length		Coil per pallet	Coil per truck
	Inch	mm	ID Inch	Wall Inch	Feet	Meters	lbs	kilos	Feet	Meters		
Reel Palletized												
ELD1334-220	1/2	13	0.503	0.034	2,200	671	51.1	23.2	2,200	671	28	728
Coil Banded Palletized												
ELD2626-166	1	26	1.043	0.026	1,660	506	58.7	26.6	1,660	506	16	416
ELD3550-050	1-1/4	35	1.365	0.050	500	152	45.0	20.4	500	152	16	416
ELD4040-060	1-1/2	40	1.595	0.040	600	183	49.9	22.6	600	183	16	416
ELD4040-030	1-1/2	40	1.595	0.040	300	91	24.9	11.3	300	91	16	416
ELD4040-015	1-1/2	40	1.595	0.040	150	46	12.5	5.7	150	46	20	520
ELD5251-015	2	52	2.052	0.051	150	46	20.4	9.3	150	46	20	520
ELD5251-045	2	52	2.052	0.051	450	137	61.3	27.8	450	137	16	416
ELD7776-020	3	77	3.043	0.076	200	61	60.3	27.3	200	61	10	300
ELD101100-013	4	101	3.996	0.100	130	40	67.7	30.7	130	40	10	300

42 psi Working Pressure												
Part Number	Hose Size		Nominal Hose Size		Coil Length		Nominal Weight		Coil Length		Coil per pallet	Coil per truck
	Inch	mm	ID Inch	Wall Inch	Feet	Meters	lbs	kilos	Feet	Meters		
Reel Palletized												
ELD1634-164	5/8	16	0.633	0.034	1640	500	47.3	21.4	1640	500	28	728
Coil Banded Palletized												
ELD2043-120	3/4	20	0.819	0.043	1200	366	56.1	25.5	1200	366	16	416
ELD2654-066	1	26	1.043	0.054	660	201	49.7	22.5	660	201	16	416
ELD3570-040	1-1/4	35	1.365	0.070	400	122	51.1	23.2	400	122	16	416
ELD4084-035	1-1/2	40	1.595	0.084	350	107	6207	28.5	350	107	16	416
ELD52108-025	2	52	2.052	0108	250	76	74.1	33.6	250	76	16	416

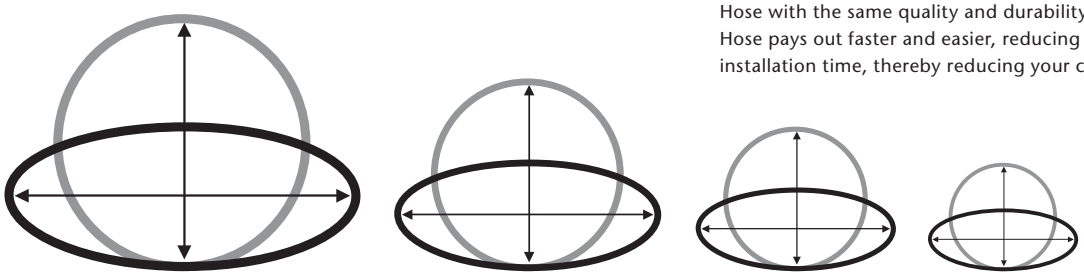
Understanding Part Numbers

Part Number: ELD 77 76 - 020



Reel Length: multiply by 10 to obtain in feet.
Nominal wall thickness in 1/1000".
Inside diameter (I.D.) in mm.

When Oval Hose is in place and pressurized it becomes round, just like Blue Stripe Round Hose with the same quality and durability! Oval Hose pays out faster and easier, reducing your installation time, thereby reducing your cost



35mm 26mm 16mm 10mm

Layflat

Premium layflat discharge hose for irrigation applications is manufactured in the USA using high quality resins and stringent quality control standards. Due to its unique 3-ply polyester yarn construction and simultaneous tube and cover extrusion process, this layflat hose offers high working pressures with minimal elongation and snaking. It is used worldwide as a flexible submain for irrigation lateral lines, and for general water transfer, and can be easily rolled up and used again for different applications or planting cycles.

FEATURES & BENEFITS

Premium hose for discharge,
transfer and sub-main lines

Standard sizes include 1.5" to 8"
Larger sizes available upon request

Working temperature
range of -5°F to 170°F

Simultaneous tube and cover process
minimizes the risk of separation

Proprietary manufacturing process
ensures performance and durability

Unique construction
minimizes elongation or distortion under pressure, ensuring security of fittings and placement

Ultraviolet inhibitors
reduce aging and weather damage

Flexible construction
allows easy coiling for reuse

LAYFLAT

SF-10 Layflat									
Part Number	Description	Standard Nominal				Metric Nominal			
		ID	Wall	Weight	Working Pressure	ID	Wall	Weight	Working Pressure
		Inches	Inches	Lbs	Psi	mm	mm	Kg	Bar
SF-10x1.5	1.5″ Layflat	1.56	0.063	56	80	39.5	1.6	28	5.5
SF-10x2.0	2.0″ Layflat	2.09	0.063	80	80	53.0	1.6	40	5.5
SF-10x3.0	3.0″ Layflat	3.07	0.063	108	80	78.0	1.6	54	5.5
SF-10x4.0	4.0″ Layflat	4.13	0.067	158	70	105.0	1.7	78	4.8
SF-10x6.0	6.0″ Layflat	6.16	0.079	272	45	156.5	2.0	135	3.1
SF-10x8.0	8.0″ Layflat	8.15	0.087	390	40	207.0	2.2	193	2.7

I.P.S. - Flexible PVC Tubing

Toro I.P.S. (Iron Pipe Size) Flexible PVC Tubing is most commonly used as a riser to connect a submain to a lateral, or to make flexible swing joints.

FEATURES & BENEFITS

- Available in ½", ¾" and 1" diameter
- 100' and 200' coils available in all sizes
- Cut-lengths readily available from 12"– 60"
- Provides more flexibility and durability than rigid PVC and is more resistant to kinking than polyethylene tubing
- Allows easy repair of rigid PVC pipe

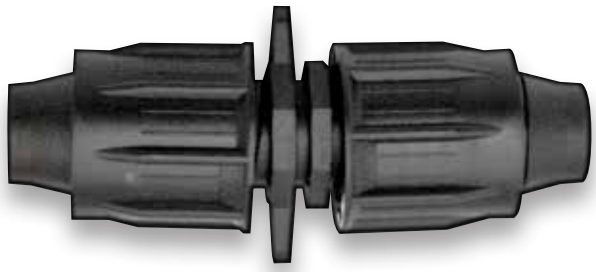
42 psi Working Pressure							
Part Number	Description	Length		Coil/Nominal Weight		Quantity per Bundle	Coils/Pieces per pallet
		Ft/In	mm	lbs	kilos		
1/2" IPS Tubing							
IPS50-100	1/2" IPS Tubing. 100' Coil	100'	30.5	20.0	9.1	-	24
IPS50-200	1/2" IPS Tubing. 200' Coil	200'	61.0	40.0	18.1	-	15
IPS50-CL12	1/2" IPS Tubing. 12" Cut Length	12"	0.30	5.0	2.3	25	4500
IPS50-CL18	1/2" IPS Tubing. 18" Cut Length	18"	0.46	7.5	3.4	25	3000
IPS50-CL24	1/2" IPS Tubing. 24" Cut Length	24"	0.61	10.0	4.5	25	2000
IPS50-CL30	1/2" IPS Tubing. 30" Cut Length	30"	0.76	12.5	5.7	25	1500
IPS50-CL36	1/2" IPS Tubing. 36" Cut Length	36"	0.91	15.0	6.8	25	1500
IPS50-CL42	1/2" IPS Tubing. 42" Cut Length	42"	1.07	17.5	7.9	25	1500
IPS50-CL48	1/2" IPS Tubing. 48" Cut Length	48"	1.22	20.0	9.1	25	1500
IPS50-CL60	1/2" IPS Tubing. 60" Cut Length	60"	1.52	25.0	11.3	25	1500
Coil Banded Palletized							
IPS75-100	3/4" IPS Tubing. 100' Coil	100'	30.5	30.0	13.6	-	21
IPS75-200	3/4" IPS Tubing. 200' Coil	200'	61.0	60.0	27.2	-	10
IPS75-CL12	3/4" IPS Tubing. 12" Cut Length	12"	0.30	8.0	3.6	25	3000
IPS75-CL18	3/4" IPS Tubing. 18" Cut Length	18"	0.46	12.0	5.4	25	2000
IPS75-CL24	3/4" IPS Tubing. 24" Cut Length	24"	0.61	16.0	7.3	25	1300
IPS75-CL30	3/4" IPS Tubing. 30" Cut Length	30"	0.76	200	9.1	25	1000
IPS75-CL36	3/4" IPS Tubing. 36" Cut Length	36"	0.91	24.0	10.9	25	1000
IPS75-CL42	3/4" IPS Tubing. 42" Cut Length	42"	1.07	28.0	12.7	25	1000
IPS75-CL48	3/4" IPS Tubing. 48" Cut Length	48"	1.22	32.0	14.5	25	1000
IPS75-CL60	3/4" IPS Tubing. 60" Cut Length	60"	1.52	40.0	18.1	25	1000
Coil Banded Palletized							
IPS100-100	1" IPS Tubing. 100' Coil	100'	30.5	41.0	18.6	-	14
IPS100-200	1" IPS Tubing. 200' Coil	200'	61.0	82.0	37.2	-	10
IPS100-CL12	1" IPS Tubing. 12" Cut Length	12"	0.30	105	4.8	25	1800
IPS100-CL18	1" IPS Tubing. 18" Cut Length	18"	0.46	15.8	7.2	25	1200
IPS100-CL24	1" IPS Tubing. 24" Cut Length	24"	0.61	21.0	9.5	25	800
IPS100-CL30	1" IPS Tubing. 30" Cut Length	30"	0.76	26.3	11.9	25	700
IPS100-CL36	1" IPS Tubing. 36" Cut Length	36"	0.91	31.5	14.3	25	700
IPS100-CL42	1" IPS Tubing. 42" Cut Length	42"	1.07	36.8	16.7	25	700
IPS100-CL48	1" IPS Tubing. 48" Cut Length	48"	1.22	42.0	19.1	25	700
IPS100-CL60	1" IPS Tubing. 60" Cut Length	60"	1.52	52.5	23.8	25	700

Maximum Working Pressure @ 73 degrees F			
Size	1/2"	3/4"	1"
PSI	65	55	50

When gluing flexible PVC tubing, the use of both a primer and PVC glue formulated for use with flexible PVC are recommended for optimal performance.


Fittings

Pro-Loc™ Fittings



Female Hose Swivel Fittings Now Available for Hose and Dripline

Easy to Spot. Tough to Beat.
Easy-to-install Pro-Loc drip tape fittings are available in a wide range of configurations, including a full line of valve options. Pro-Loc fittings are also available for hose and dripline — designed to last for the life of the irrigation system.

FEATURES & BENEFITS

Pro-Loc fittings deliver the quality you expect from Toro for reliable performance, season after season.

Pro-Loc Fittings
- Tight Seal — Coarse thread ensures a tight seal, even in dirty conditions.
- Easy to Install — Easy-to-grip nut provides a secure connection every time.

Pro-Loc Drip Tape Fittings
- Easy to See — Bright blue nut makes tape fittings easy to find, remove and reuse.
- Low Profile — Compact design doesn't interfere with retrieving the tape.

Pro-Loc™ Tape Fittings

PRO-LOC TAPE FITTINGS		
Couplings		
	FTC500	5/8" Tape Coupling
	FTC700	7/8" Tape Coupling
	FTC800	1" Tape Coupling
Barb Adapters		
	FTA5-250B	5/8" Tape x 250 Series Barb Adapter
	FTA5-400B	5/8" Tape x 400 Series Barb Adapter
	FTA5-700B	5/8" Tape x 700 Series Barb Adapter
	FTA7-700B	7/8" Tape x 700 Series Barb Adapter
	FTA5-425G	5/8" Tape x 425 Series Barb Adapter with Integral Gasket*
	FTA5-425GR	5/8" Tape x 425 Series Barb Adapter with Rubber Grommet*
	FTA7-425GR	7/8" Tape x 425 Series Barb Adapter with Rubber Grommet*
Grommets		
	FTHG4	Top Hat Grommet for 400 - 425 Series Barbs
Adapters		
	FTA5-75FHS	5/8" Tape x 3/4" Female Hose Swivel Adapter
	FTA5-75MPT	5/8" Tape x 3/4" MPT Male Adapter
	FTA7-75MPT	7/8" Tape x 3/4" MPT Male Adapter
Flush Valves		
	FFVFPT-L	Automatic Flush Valve x 3/4" Female Low Flow - White
	FFVFPT-H	Automatic Flush Valve x 3/4" Female High Flow - Red
	FTA5-FVL	5/8" Tape x Low Pressure Flush Valve
	FTA7-FVL	7/8" Tape x Low Pressure Flush Valve
Layflat Takeoff Fittings		
	FTA5-LF	5/8" Tape x Layflat Takeoff - Single Grip**
	FTA7-LF	7/8" Tape x Layflat Takeoff - Single Grip**
	FTA5-LF2	5/8" Tape x Layflat Takeoff - Double Grip**

PRO-LOC TAPE FITTINGS		
Barbed Hose Adapters		
	FTA5-500HB	5/8" Tape x 500 Series Hose Barb Adapter
	FTA5-700HB	5/8" Tape x 700 Series Hose Barb Adapter
	FTA7-700HB	7/8" Tape x 700 Series Hose Barb Adapter
Hose Nut Adapters		
	FTA5-600HN	5/8" Tape x 600 Series Pro-Loc Adapter with Locking Nut
Tees		
	FTT500	5/8" Tape Tee
	FTT700	7/8" Tape Tee
Barbed Tees		
	FTT5-500HB	5/8" Tape Tee x 500 Series Hose Barb
	FTT5-700HB	5/8" Tape Tee x 700 Series Hose Barb
Shutoff Valves		
	FTV500	5/8" Tape Shutoff Valve
	FTV700	7/8" Tape Shutoff Valve
	FTV5-250B	5/8" Tape x 250 Barb Adapter Shutoff Valve
	FTV7-250B	7/8" Tape x 250 Barb Adapter Shutoff Valve
	FTV5-400B	5/8" Tape x 400 Barb Adapter Shutoff Valve
	FTV7-400B	7/8" Tape x 400 Barb Adapter Shutoff Valve
Barbed Shutoff Valve with Locking Nut		
	FTV5-420BN	5/8" Tape x 420 Series Barb with Locking Nut Shutoff Valve
	FTV5-500HN	5/8" Tape x 500 Series Hose Barb with Locking Nut Shutoff Valve
Barbed Shutoff Valves		
	FTV5-500HB	5/8" Tape x 500 Series Hose Barb Shutoff Valve
	FTV7-500HB	7/8" Tape x 500 Series Hose Barb Shutoff Valve
Layflat Takeoff Shutoff Valve		
	FTV5-LF	5/8" Tape x Layflat Takeoff Shutoff Valve**
	FTV7-LF	7/8" Tape x Layflat Takeoff Shutoff Valve**

* 15mm or 0.59" drill size

** Requires a 14mm layflat punch

Note: For Tape x Tubing Assemblies, see page 15

Pro-Loc™ Hose and Dripline Fittings

PRO-LOC HOSE AND DRIPLINE FITTINGS		
Couplings		
	FHC500	500 Series Pro-Loc Coupling
	FHC600	600 Series Pro-Loc Coupling
	FHC700	700 Series Pro-Loc Coupling
	FHC800	800 Series Pro-Loc Coupling
Threaded Adapters		
	FHA5-50MPT	500 Series Pro-Loc x 1/2" Male Pipe Thread Adapter
	FHA6-50MPT	600 Series Pro-Loc x 1/2" Male Pipe Thread Adapter
	FHA7-50MPT	700 Series Pro-Loc x 1/2" Male Pipe Thread Adapter
	FHA5-75MPT	500 Series Pro-Loc x 3/4" Male Pipe Thread Adapter
	FHA6-75MPT	600 Series Pro-Loc x 3/4" Male Pipe Thread Adapter
	FHA7-75MPT	700 Series Pro-Loc x 3/4" Male Pipe Thread Adapter
	FHA8-75MPT	800 Series Pro-Loc x 3/4" Male Pipe Thread Adapter
Threaded Adapters x 3/4" Female Hose Swivel		
	FHA5-75FHS	500 Ser Pro-Loc x 3/4" Female Hose Swivel
	FHA6-75FHS	600 Ser Pro-Loc x 3/4" Female Hose Swivel
	FHA7-75FHS	700 Ser Pro-Loc x 3/4" Female Hose Swivel
	FHA8-75FHS	800 Ser Pro-Loc x 3/4" Female Hose Swivel
	FHA5-75FHSS	500 Ser Pro-Loc x 3/4" Female Hose Swivel with Screen
	FHA6-75FHSS	600 Ser Pro-Loc x 3/4" Female Hose Swivel with Screen
	FHA7-75FHSS	700 Ser Pro-Loc x 3/4" Female Hose Swivel with Screen
	FHA8-75FHSS	800 Ser Pro-Loc x 3/4" Female Hose Swivel with Screen

PRO-LOC HOSE AND DRIPLINE FITTINGS		
Barbed Adapters with Rubber Grommet		
	FHA5-425RG	500 Series Pro-Loc x 425 Series Barb with Rubber Grommet*
	FHA6-425RG	600 Series Pro-Loc x 425 Series Barb with Rubber Grommet*
	FHA7-425RG	700 Series Pro-Loc x 425 Series Barb with Rubber Grommet*
	FHA8-425RG	800 Series Pro-Loc x 425 Series Barb with Rubber Grommet*
Layflat Takeoffs		
	FHA5-LF	500 Series Pro-Loc x Layflat Takeoff Single Grip**
	FHA6-LF	600 Series Pro-Loc x Layflat Takeoff Single Grip**
	FHA7-LF	700 Series Pro-Loc x Layflat Takeoff Single Grip**
	FHA8-LF	800 Series Pro-Loc x Layflat Takeoff Single Grip**
	FHA5-LF2	500 Series Pro-Loc x Layflat Takeoff Double Grip**

* 15mm or 0.59" drill size

** Requires a 14mm layflat punch

PRO-LOC HOSE AND DRIPLINE FITTINGS SELECTION GUIDE

Series Number	Inside Diameter Tolerance		Wall Thickness Tolerance	
	Inches	Millimeters	Inches	Millimeters
500	0.519 - 0.590	13.2 - 15.0	0.020 - 0.055	0.50 - 1.40
600	0.598 - 0.649	15.2 - 16.5	0.030 - 0.055	0.75 - 1.40
700	0.677 - 0.728	17.2 - 18.5	0.032 - 0.055	0.80 - 1.40
800	0.787 - 0.846	20.0 - 21.5	0.040 - 0.059	1.00 - 1.50

Pro-Loc™ Hose and Dripline Fittings

PRO-LOC HOSE AND DRIPLINE FITTINGS		
Elbows		
	FHE500	500 Series Pro-Loc Elbow
	FHE600	600 Series Pro-Loc Elbow
	FHE700	700 Series Pro-Loc Elbow
	FHE800	800 Series Pro-Loc Elbow
Tees		
	FHT500	500 Series Pro-Loc Tee
	FHT600	600 Series Pro-Loc Tee
	FHT700	700 Series Pro-Loc Tee
	FHT800	800 Series Pro-Loc Tee
Tee x 3/4" Male Pipe Thread		
	FHT5-75MPT	500 Series Pro-Loc Tee x 3/4" Male Pipe Thread
	FHT6-75MPT	600 Series Pro-Loc Tee x 3/4" Male Pipe Thread
	FHT7-75MPT	700 Series Pro-Loc Tee x 3/4" Male Pipe Thread
	FHT8-75MPT	800 Series Pro-Loc Tee x 3/4" Male Pipe Thread
Tees x 3/4" Female Hose Swivel		
	FHT5-75FHS	500 Ser Pro-Loc Tee x 3/4" Female Hose Swivel
	FHT6-75FHS	600 Ser Pro-Loc Tee x 3/4" Female Hose Swivel
	FHT7-75FHS	700 Ser Pro-Loc Tee x 3/4" Female Hose Swivel
	FHT8-75FHS	800 Ser Pro-Loc Tee x 3/4" Female Hose Swivel
	FHT5-75FHSS	500 Ser Pro-Loc Tee x 3/4" Female Hose Swivel with Screen
	FHT6-75FHSS	600 Ser Pro-Loc Tee x 3/4" Female Hose Swivel with Screen
	FHT7-75FHSS	700 Ser Pro-Loc Tee x 3/4" Female Hose Swivel with Screen
	FHT8-75FHSS	800 Ser Pro-Loc Tee x 3/4" Female Hose Swivel with Screen

PRO-LOC HOSE AND DRIPLINE FITTINGS		
Shutoff Valves		
	FHV500	500 Series Pro-Loc Shutoff Valve
	FHV600	600 Series Pro-Loc Shutoff Valve
	FHV700	700 Series Pro-Loc Shutoff Valve
	FHV6-250B	600 Series Pro-Loc x 250 Series Barb Shutoff Valve
	FHV6-425G	600 Series Pro-Loc x 425 Series Barb Shutoff Valve with Grommet
Male Thread Shutoff Valves		
	FHV5-50MPT	500 Series Pro-Loc x 1/2" Male Pipe Thread Shutoff Valve
	FHV6-50MPT	600 Series Pro-Loc x 1/2" Male Pipe Thread Shutoff Valve
	FHV7-50MPT	700 Series Pro-Loc x 1/2" Male Pipe Thread Shutoff Valve
	FHV5-75MPT	500 Series Pro-Loc x 3/4" Male Pipe Thread Shutoff Valve
	FHV6-75MPT	600 Series Pro-Loc x 3/4" Male Pipe Thread Shutoff Valve
	FHV7-75MPT	700 Series Pro-Loc x 3/4" Male Pipe Thread Shutoff Valve
	FHV75MHT-75FHS	3/4" Male Hose Thread x 3/4" Female Hose Swivel with Shutoff Valve

* 15mm or 0.59" drill size

PRO-LOC HOSE AND DRIPLINE FITTINGS SELECTION GUIDE

Series Number	Inside Diameter Tolerance		Wall Thickness Tolerance	
	Inches	Millimeters	Inches	Millimeters
500	0.519 - 0.590	13.2 - 15.0	0.020 - 0.055	0.50 - 1.40
600	0.598 - 0.649	15.2 - 16.5	0.030 - 0.055	0.75 - 1.40
700	0.677 - 0.728	17.2 - 18.5	0.032 - 0.055	0.80 - 1.40
800	0.787 - 0.846	20.0 - 21.5	0.040 - 0.059	1.00 - 1.50

Barbed Hose Fittings & Installation Tools

BARBED HOSE AND DRIPLINE FITTINGS		
Barbed Couplings		
	FBC400B	400 Series Barb Coupling
	FBC500	500 Series Barb Coupling
	FBC700	700 Series Barb Coupling
	FBC1000	1000 Series Barb Coupling
	FBC1200	1200 Series Barb Coupling
	FBC1400	1400 Series Barb Coupling
Barbed Tees		
	FBT500	500 Series Barb Tee
	FBT700	700 Series Barb Tee
	FBT1000	1000 Series Barb Tee
	FBT1200	1200 Series Barb Tee
	FBT1400	1400 Series Barb Tee

BARBED HOSE AND DRIPLINE FITTINGS SELECTION CHART

Series Number	Inside Diameter	
	Inches	Millimeters
500	0.519	13.2
700	0.661	16.8
1000	0.850	21.6
1200	1.110	28.2
1400	1.385	35.2

BARBED HOSE AND DRIPLINE FITTINGS		
Male Thread Adapters		
	FBA5-50MPT	500 Series Barb x 1/2" Male Pipe Thread Adapter
	FBA7-50MPT	700 Series Barb x 1/2" Male Pipe Thread Adapter
	FBA10-50MPT	1000 Series Barb x 1/2" Male Pipe Thread Adapter
	FBA5-75MPT	500 Series Barb x 3/4" Male Pipe Thread Adapter
	FBA7-75MPT	700 Series Barb x 3/4" Male Pipe Thread Adapter
	FBA10-75MPT	1000 Series Barb x 3/4" Male Pipe Thread Adapter

INSTALLATION TOOLS		
Layflat installation Tools		
	LF-INST	T-Handle Hex Tool for Layflat Installation
	LF-CUT14	Layflat Cutter - 14mm
	LF-CUT16	Layflat Cutter - 16mm
	LF-CUT19	Layflat Cutter - 19mm
400 Series Barb Tool		
	INS-400SX	400B Cutting and Inserting Tool - Extra Short
	INS-400S	400B Cutting and Inserting Tool - Short
	INS-400AS	400B Cutting and Inserting Tool with Adjustable Tip - Short
	INS-400AL	400B Cutting and Inserting Tool with Adjustable Tip - Long
	TIP-400SX	400B Replacement Tip - Extra Short
	TIP-400S	400B Replacement Tip - Short
	TIP-400AS	400B Replacement Adjustable Tip - Short
	TIP-400AL	Replacement Adjustable Tip - Long


Aqua-Traxx®
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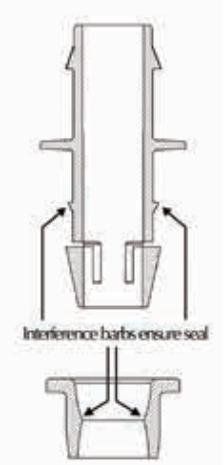
Xpando® Take-Off Fittings

FEATURES & BENEFITS

- Easy to install, reducing both time and cost of installation.
- Innovative Xpando Take-Off Adapter with collapsible barb prevents pull-out and reduces grommet damage during the installation process.
- Top Hat grommet with internal step combines with Xpando interference barb to hold take-off firmly in place.
- UV stabilized materials for long life.
- Compatible with standard polyethylene drip irrigation tubing, reducing cost and easing logistics.

Xpando Take-Off fittings are an improved method of connecting low pressure irrigation tubes and driplines to polyethylene tubes and PVC mainlines. Xpando Take-Off fittings and grommets are offered in a wide array of dimensions to fill all your micro-irrigation connection needs.



XPANDO TAKE-OFF ADAPTORS

Part #	Description	Toro Hose
XP-13x13	13mm grommet inlet x 13mm takeoff	EHD1350
XP-13x14	13mm grommet inlet x 14mm takeoff	EHD1350
XP-13x15	13mm grommet inlet x 15mm takeoff	EHD1554
XP-16x16	16mm grommet inlet x 16mm takeoff	EHO1650
XP-16x18	16mm grommet inlet x 18mm takeoff	EHD1850
XP-19x21	19mm grommet inlet x 21mm takeoff	EHO2055

Part #	Description	Toro IPS
XP-13x15	13mm grommet inlet x 15mm takeoff	IPS50
XP-19x19	19mm grommet inlet x 19mm takeoff	IPS75
XP-19x25	19mm grommet inlet x 25mm takeoff	IPS100

RUBBER GROMMETS

Parts #	Description
CAP-13	13mm rubber grommet
CAP-16	16mm rubber grommet
CAP-19	19mm rubber grommet

The Xpando Take-Off is installed by first inserting the grommet into PVC or HDPE pipe, then inserting the collapsing barb into the Grommet. As the barb enters it collapses inward eliminating grommet damage.

Procedure

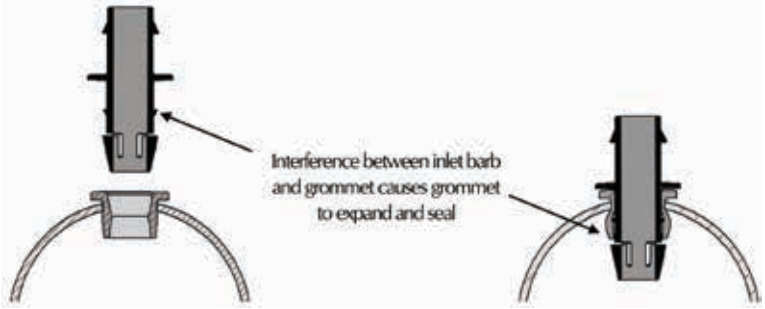
- Drill hole in PVC or HDPE pipe to the appropriate size as per Tape Risor Assembly Details table.
- Clean burrs from edge of hole before inserting Grommet.
- Push Xpando adapter into grommet ensuring flange finishes flush with top of grommet. Lubricate with water to aid insertion.
- Install further connections to adapter using appropriately sized LDPE tube.

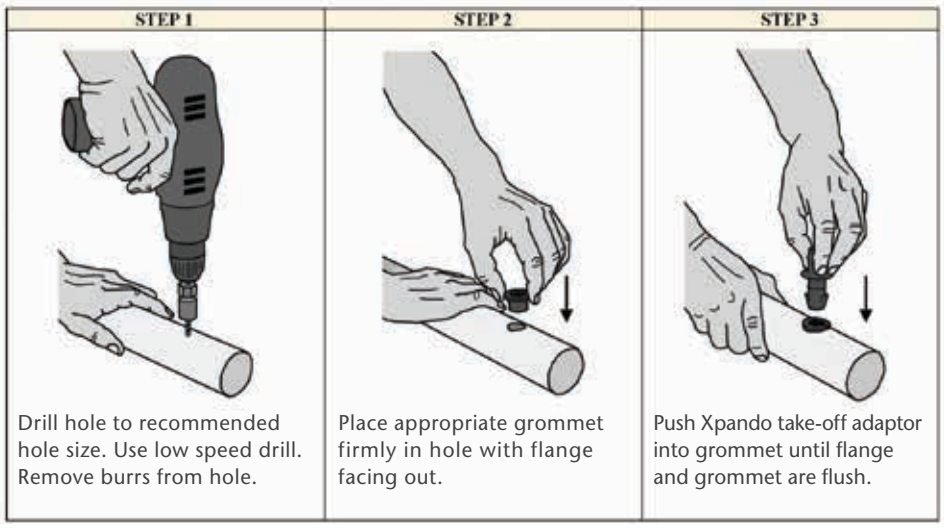
TAPE RISOR ASSEMBLY DETAILS

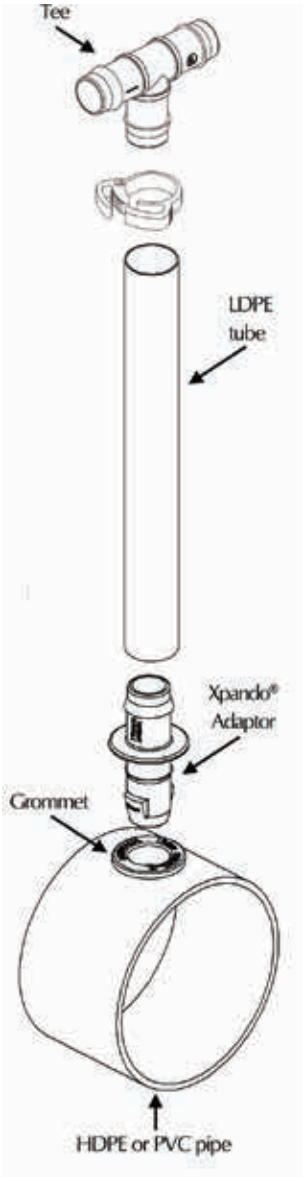
Tape	Hose	Xpando	Grommet	Wire Tie	Min. PVC ID	Hole Size*
5/8"	EHD1350	XP-13x13	CAP-13	6"	1 1/2"	5/8"
7/8"	EHD1850	XP-16x18	CAP-16	7"	2"	3/4"
1"	EHO2055	XP-19x21	CAP-19	8"	2"	7/8"

MATERIALS

Adaptor	Material
Xpando Adapters: all sizes	Acetal
Rubber grommets: all sizes	Thermoplastic rubber



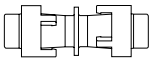




Hose Fittings Loc-Eze™

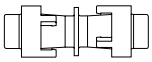
Part Number	Description

Coupling, (ID) Loc-Eze X (ID) Loc-Eze



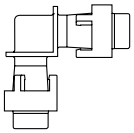
FCC13	13mm Loc-Eze X 13mm Loc-Eze
FCC15	15mm Loc-Eze X 15mm Loc-Eze
FCC16	16mm Loc-Eze X 16mm Loc-Eze

Reducer Coupling, (ID) Loc-Eze X (ID) Loc-Eze



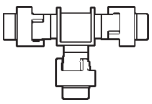
FCR1613	16mm Loc-Eze X 13mm Loc-Eze

Elbow, (ID) Loc-Eze X (ID) Loc-Eze



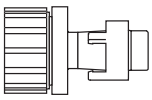
FEE13	13mm Loc-Eze X 13mm Loc-Eze
FEE16	16mm Loc-Eze X 16mm Loc-Eze

Tee, (ID) Loc-Eze X (ID) Loc-Eze X (ID) Loc-Eze



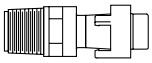
FTT13	13mm X 13mm X 13mm Loc-Eze
FTT16	16mm X 16mm X 16mm Loc-Eze

Male Adaptor, 3/4" FHT Swivel X (ID) Loc-Eze



FAS16	3/4" FHT Swivel w/screen X 16mm Loc-Eze
FAS16-1	3/4" FHT Swivel w/washer X 16mm Loc-Eze

Male Adaptor, 1/2" MNPT X (ID) Loc-Eze



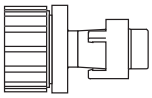
FAM13	1/2" MNPT x 13mm Loc-Eze w/out cap
FAM16 1	/2" MNPT x 16mm Loc-Eze w/out cap

Adaptor Tee, 1/2" FNPT X (ID) Loc-Eze X (ID) Loc-Eze

FTF16	1/2" FNPT x 16mm Loc-Eze X 16mm Loc-Eze

Part Number	Description

Adaptor Tee, 3/4" FHT Swivel X (ID) Loc-Eze X (ID) Loc-Eze

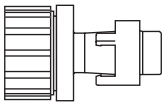


FTS13	3/4" FHT Swivel w/screen100 X 13mm Loc-Eze x 13mm Loc-Eze
FTS16	3/4" FHT Swivel w/screen X 16mm Loc-Eze x 16mm Loc-Eze
FTS16-1	3/4" FHT Swivel w/washer X 16mm Loc-Eze x 16mm Loc-Eze

Adaptor Tee, 1/2" Slip X (ID) Loc-Eze X (ID) Loc-Eze

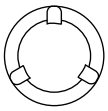
FTV16	1/2" Slip x 16mm Loc-Eze, 16mm Loc-Eze

Hose End, 3/4" MHT X (ID) Loc-Eze



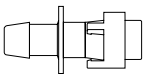
FJA16	3/4" MHT X 16mm Loc-Eze w/out cap
FJJ13	3/4" MHT X 13mm Loc-Eze with cap
FJJ16	3/4" MHT X 16mm Loc-Eze with cap
FEP1380	3/4" FHT Cap w/washer

Replacement Loc-Eze Rings



FEP1846	Ring for 10mm fittings
FEP1844	Ring for 13mm fittings
FEP1956	Ring for 15mm fittings
FEP1847	Ring for 16mm fittings

Oval Hose Connector, 7mm Barb X Hose (ID) Loc-Eze



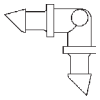
FCA0710	7mm barb x 10mm Loc-Eze
FCA0713	7mm barb x 13mm Loc-Eze
FCA0716	7mm barb x 16mm Loc-Eze

Part Number	Description

Coupling, (ID) Barb X (ID) Barb

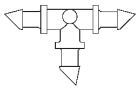
FCC0400	4mm Barb X 4mm Barb
FCC0400-100	4mm Barb X 4mm Barb
FCC0600	6mm Barb X 6mm Barb
FCC1500	15mm Barb X 15mm Barb

Elbow, (ID) Barb X (ID) Barb



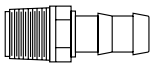
FEE0400	4mm Barb X 4mm Barb
FEE0400-100	4mm Barb X 4mm Barb
FEE1500	15mm Barb X 15mm Barb

Tee, (ID) Barb X (ID) Barb X (ID) Barb



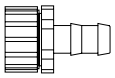
FTT0400	4mm X 4mm X 4mm Barb
FTT0400-100	4mm X 4mm X 4mm Barb
FTT1500	15mm X 15mm X 15mm Barb

Male Adaptor, 1/2" MNPT X (ID) Barb



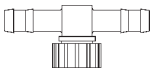
FAM1500	1/2" MNPT x 15mm Barb w/out cap

Male Adaptor, 3/4" FHT Swivel X (ID) Barb



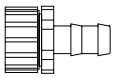
FAS1500	3/4" FHT Swivel w/screen X 15mm Barb
FAS1500-1	3/4" FHT Swivel w/washer X 15mm Barb

Adaptor Tee, 3/4" FHT Swivel X (ID) Barb X (ID) Barb



FTS1500	3/4" FHT Swivel w/screen X 15mm Barb X 5mm Barb
FTS1500-1	3/4" FHT Swivel w/washer X 15mm Barb X 15mm Barb

Hose End, 3/4" MHT X (ID) Barb



FJA1500	3/4" MHT X 15mm Barb w/out cap
FJJ1500	3/4" MHT X 15mm Barb

Part Number	Description

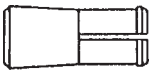
Rubber Grommet Adaptors, for PVC.

FGR15	Rubber Grommet with 1/2" FNPT, drill size 1.0" 25.5mm, min PVC size: 1-1/2" 40mm (for use with FAM fittings)
FGR20	Rubber Grommet with 3/4" FNPT, drill size 1.2" 30mm, min PVC size: 1-1/2" 40mm (for use with FAM fittings)
FGR25	Rubber Grommet with 1" FNPT, drill size 1.5" 38mm, min PVC size: 2" 50mm

Hose Plug

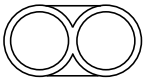
FPG01	Single side hose plug
FPG02	Dual side hose plug

Wedge Plug



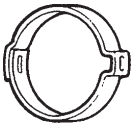
FTC10	10mm Wedge Plug, PVC drill size 15/32", poly drill size 29/64", min PVC size 3/4" 20mm
FTC13	13mm Wedge Plug, PVC drill size 19/32", poly drill size 37/64", min PVC size 1" 25mm
FTC16	16mm Wedge Plug, PVC drill size 23/32", poly drill size 45/64", min PVC size 1-1/4" 32mm

Figure 8 End Clamp



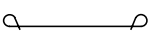
FJQ13	13mm figure 8 end clamp
FJQ16	16mm figure 8 end clamp
FJQ20	20mm figure 8 end clamp
FJQ26	26mm figure 8 end clamp

Oetiker 1-Ear Clamps



WFL0040	(198R) Nominal Size 3/4", Closed .618", Open .779"
WFL0042	(210R) Nominal Size 13/16", Closed .716", Open .827"
WFL0043	(256R) Nominal Size 1", Closed .898, Open .1.008"
WFL0044	(316R) Nominal Size 1 1/4", Closed 1.122", Open 1.244"
WFL0045	(1098) Straight Jaw Pliers

Wire Ties & Handles



FMH08-1	Wire tie handle
FWA01	Stainless steel wire tie, 18 gauge, 6" long
FWA02	Galvanized steel wire tie, 18 gauge, 6" long

Rubber Grommet, takeoff for PVC X 7mm Barb

FGP10	Rubber Grommet for 7mm Barb (for use with FCA fittings), use drill bit size 9/16"

Blue Stripe Oval Hose and Layflat Connections

Coupling

Reducer

Spigot Adapter

Slip Adapter

Worm Gear Clamp

PVC insert fittings for layflat and oval hose applications. These precise, fabricated fittings are designed to work with both Toro layflat and Blue Stripe® Oval Hose. Sharp barbs ensure the most secure connection possible, preventing leakage or slippage during operation.

FEATURES & BENEFITS

Premium fittings ensure secure connections with Blue Stripe® Oval Hose or layflat hose
For water transfer, sub-main, and main lines.

Standard sizes include 2.0" to 8.0"
To ensure convenience and efficiency. Other sizes available upon request with minimum quantity runs.

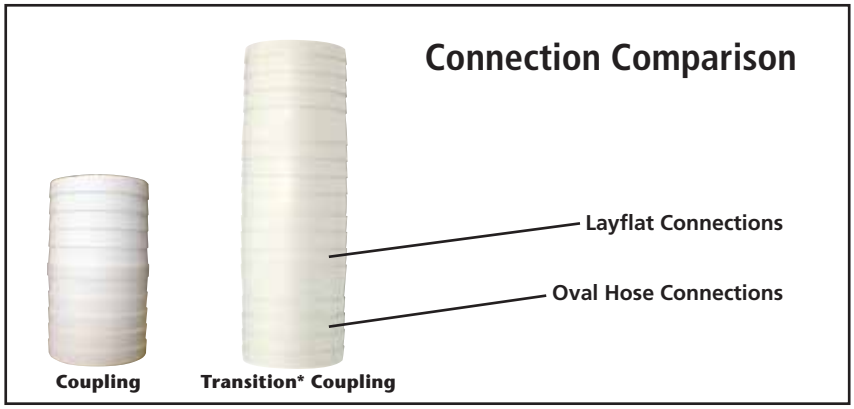
Insert couplings, spigot adapters (male connection), slip adapters (female connection), and reducers are stocked items
Tees, elbows and all other applicable fittings available upon request.

Specially engineered barbs sink deep into tubing walls
To ensure the strongest possible bond with no slippage.

Proprietary manufacturing process
Ensures premium performance and reliability.

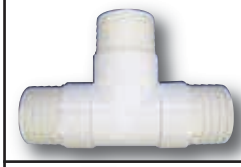
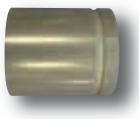
Easy to install
Reducing both time and cost of installation.

Available in both Schedule 40 and 80 PVC, and HDPE



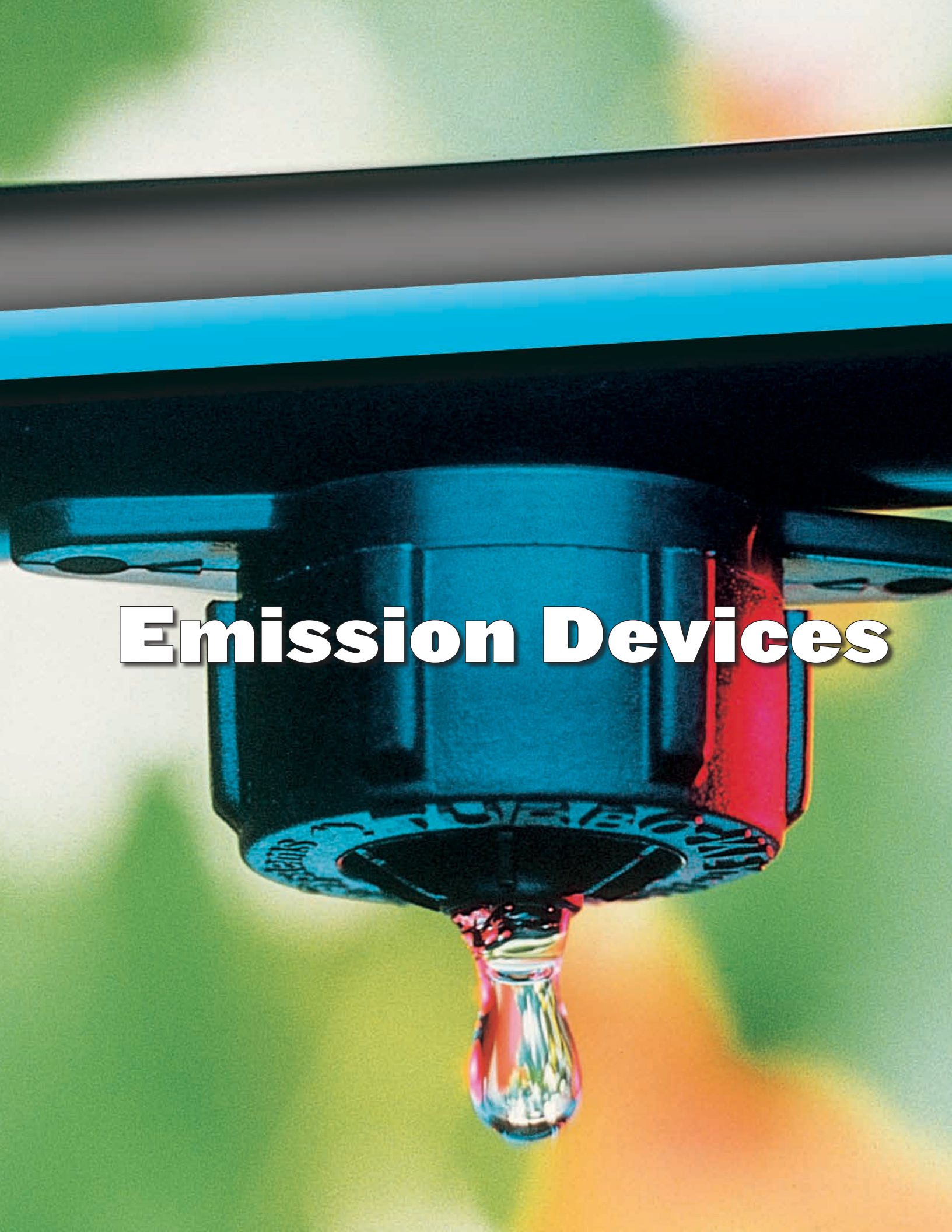
*Transition Fittings available for all configurations

Blue Stripe Oval Hose and Layflat Fittings - Poux Plastics

Picture	Part Number	Transition Part No.	Description
	**Insert Couplings (Standard)**		
	C02	DF-C02	2" Insert Couplings
	C03	DF-C03	3" Insert Couplings
	C04	DF-C04	4" Insert Couplings
	C06	DF-C06	6" Insert Couplings
	C08	DF-C08	8" Insert Couplings
	**Insert Tee (Standard)**		
	T02	DF-T02	2" Insert Tee
	T03	DF-T03	3" Insert Tee
	T04	DF-T04	4" Insert Tee
	T06	DF-T06	6" Insert Tee
	T08	DF-T08	8" Insert Tee
	**Insert Elbow (Standard)**		
	L02	DF-L02	2" Insert Elbow
	L03	DF-L03	3" Insert Elbow
	L04	DF-L04	4" Insert Elbow
	L06	DF-L06	6" Insert Elbow
	L08	DF-L08	8" Insert Elbow
	**Insert Spigot Adapters (Standard)**		
	ISP02	DF-ISP02	2" Insert Spigot Adapters
	ISP03	DF-ISP03	3" Insert Spigot Adapters
	ISP04	DF-ISP04	4" Insert Spigot Adapters
	ISP06	DF-ISP06	6" Insert Spigot Adapters
	ISP08	DF-ISP08	8" Insert Spigot Adapters
	**Insert Slip Adapters (Standard)**		
	IXS02	DF-IXS02	2" Insert Slip Adapters
	IXS03	DF-IXS03	3" Insert Slip Adapters
	IXS04	DF-IXS04	4" Insert Slip Adapters
	IXS06	DF-IXS06	6" Insert Slip Adapters
	IXS08	DF-IXS08	8" Insert Slip Adapters
	**Insert Reducers (Standard)**		
	R32	DF-R32	3"x 2" Insert Reducers
	R43	DF-R43	4"x 3" Insert Reducers
	R64	DF-R64	6"x 4" Insert Reducers
	**Insert Male Adapter (Standard)**		
	MA02	DF-MA02	2" Insert Male Adapter
	MA03	DF-MA03	3" Insert Male Adapter
	MA04	DF-MA04	4" Insert Male Adapter
	MA06	DF-MA06	6" Insert Male Adapter
	MA08	DF-MA08	8" Insert Male Adapter
	**Insert Plug (Standard)**		
	PL02	DF-PL02	2" Insert Plug
	PL03	DF-PL03	3" Insert Plug
	PL04	DF-PL04	4" Insert Plug
	PL06	DF-PL06	6" Insert Plug
	PL08	DF-PL08	8" Insert Plug
	**Insert Victaulic Groove (Standard)**		
	VG02PE	N/A	2" Victaulic Groove x Plain End Fitting
	VG03PE	N/A	3" Victaulic Groove x Plain End Fitting
	VG04PE	N/A	4" Victaulic Groove x Plain End Fitting
	VG06PE	N/A	6" Victaulic Groove x Plain End Fitting
	VG08PE	N/A	8" Victaulic Groove x Plain End Fitting
	VG02IN	N/A	2" Victaulic Groove x Insert Barb
	VG03IN	N/A	3" Victaulic Groove x Insert Barb
	VG04IN	N/A	4" Victaulic Groove x Insert Barb
	VG06IN	N/A	6" Victaulic Groove x Insert Barb
	VG08IN	N/A	8" Victaulic Groove x Insert Barb

Blue Stripe Oval Hose and Layflat Connections

Toro Product Sizing Chart					
	Toro Part Number				
Size	Oval Hose*	Layflat	Clamp	Min. Clamp Size	Max. Clamp Size
1.5"	ELD4040-xxx, ELD4084-xxx	SF-10x1.5, SF-50x1.5, SF-55x1.5	Clamp 1.5	1"	2"
2.0"	ELD5251-xxx, ELD52108-xxx	SF-10x2.0, SF-50x2.0, SF-55x2.0	Clamp 2	1.5"	2.5"
3.0"	ELD7776-xxx	SF-10x3.0, SF-50x3.0, SF-55x3.0	Clamp 3	2.75"	3.75"
4.0"	ELD101100-xxx	SF-10x4.0, SF-50x4.0, SF-55x4.0	Clamp 4	2.5"	4.5"
6.0"	n/a	SF-10x6.0, SF-50x6.0, SF-55x6.0	Clamp 6	4.5"	6.5"
8.0"	n/a	SF-10x8.0, SF-50x8.0	Clamp 8	6.5"	8.5"



Emission Devices

NGE® SF

Self-flushing Pressure Compensating Emitter

The NGE SF is a precise, pressure compensating emitter engineered for use in vineyards, orchards, nurseries, greenhouse and landscape applications. The emitter's unique design provides flushing during operation and shutdown and prevents back-siphonage, providing added protection against clogging.

FEATURES & BENEFITS

Uniform flow rates from 8 to 60 psi (0.55 to 4.1 Bar). This wide pressure range makes the NGE emitter ideal for use in difficult topographical conditions. With a Cv of 3% or less, the NGE is one of the highest performing emitters available.

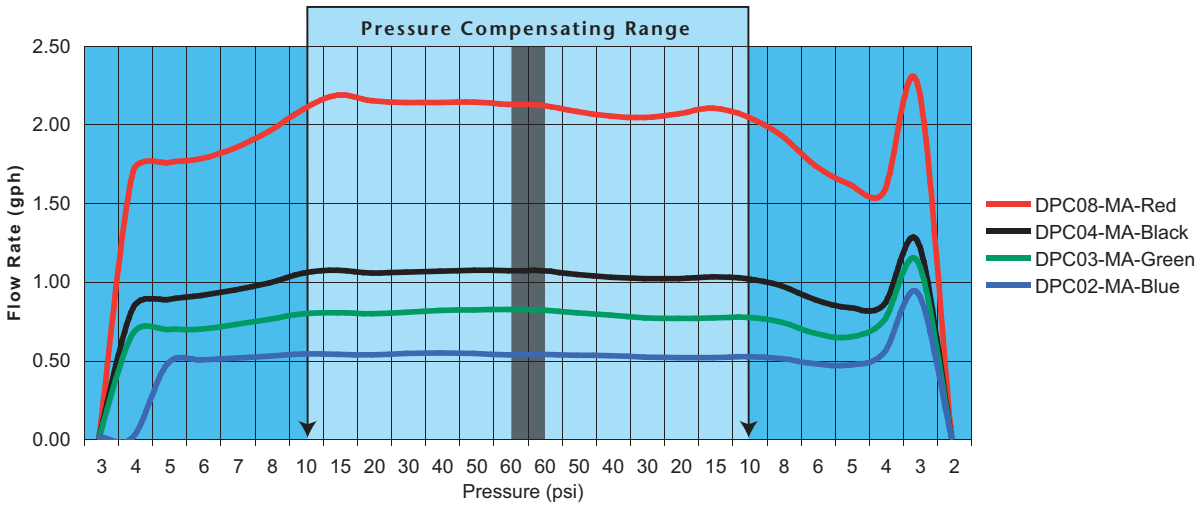
Available in male adapter (-MA) or snap on dust cap (-DC) configurations.

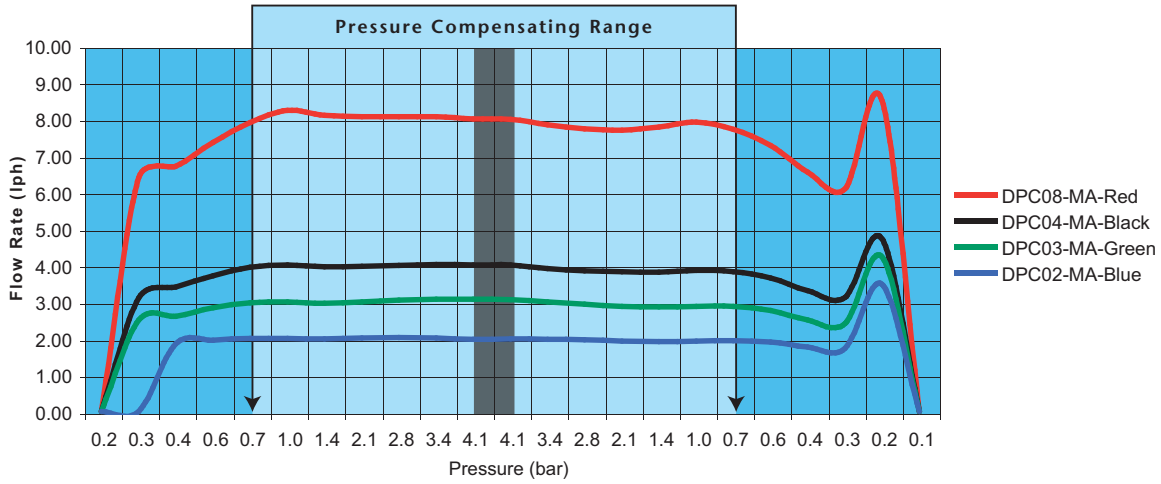
- The male adaptor option with an internal bug shield deters the entry of insects and can also be used with 1/4" (4mm) leader tube or the Black Spider multi-outlet device.
- The dust cap option deters dust and insects from entering the emitter.

Available in four flow rates:

DPC02-MA-Blue	0.5 gph	2.0 lph
DPC03-MA-Green	0.8 gph	3.0 lph
DPC04-MA-Black	1.0 gph	4.0 lph
DPC08-MA-Red	2.1 gph	8.0 lph

FLOW RATE





SPECIFICATIONS

Nominal Flow Rates (Q)	DPC02	DPC03	DPC04	DPC08
gph	0.5	0.8	1.0	2.1
lph	2.0	3.0	4.0	8.0
Recommended Pressure Range (P)				
psi	8 to 60 psi			
bar	0.6 to 4.1 Bar			
Emitter Specs				
Emitter Exponent (x)	0.000	0.001	0.000	0.002
Coefficient of variation (Cv)	≤ 3%			
Minimum Filtration Requirement				
Mesh	120			
Micron	125			
Optional Outlet	-MA (male adaptor) / -DC (dust cap)			
Color	Blue	Green	Black	Red

Understanding Part Numbers

Example: DPC04-MA-Black

DPC 04 -MA -Black

- DPC: Model
- 04: Flow Rate (lph)
- -MA: MA = Male Adapter, DC = Dust Cap (Outlet Configuratio)
- -Black: Color (Base)

NGE® AL

Anti-Drain Pressure Compensating Emitter

The NGE AL pressure compensating emitter is ideal for greenhouse and nursery applications, or any situation that requires precise irrigation of containers or individual plants. Water is applied uniformly from each emitter outlet, and the unique anti-drain feature eliminates drainage caused by differences in elevation.

FEATURES & BENEFITS

Acid resistant high-grade material construction
Provides the emitter with superior weathering characteristics and protection against chemical degradation.

The unique emitter design and pressure compensating diaphragm allows:

- the emitter to remain closed until an opening pressure of 13 psi (0.9 Bars) is achieved. As a result, start-up time is kept to a minimum, and uniformity is maximized.
- self-flushing during operation to facilitate cleaning.
- the emitter to shut-off at 3.0 to 5.0 psi (0.24 to 0.34 Bar) depending on the emitter flow rate. This prevents complete drainage of system pipes and facilitates efficient system pulsing. Quicker system start-up also results in a reduction of chemical and fertilizer waste.
- the emitter to close upon system shut down, thus inhibiting back siphoning and reducing the risk of emitter clogging.

The semi-circle inlet filters and large turbulent flow path design
Provide clogging resistance by preventing large debris from entering the emitter, and by allowing smaller particles to exit the flowpath during the self-flushing cycle.

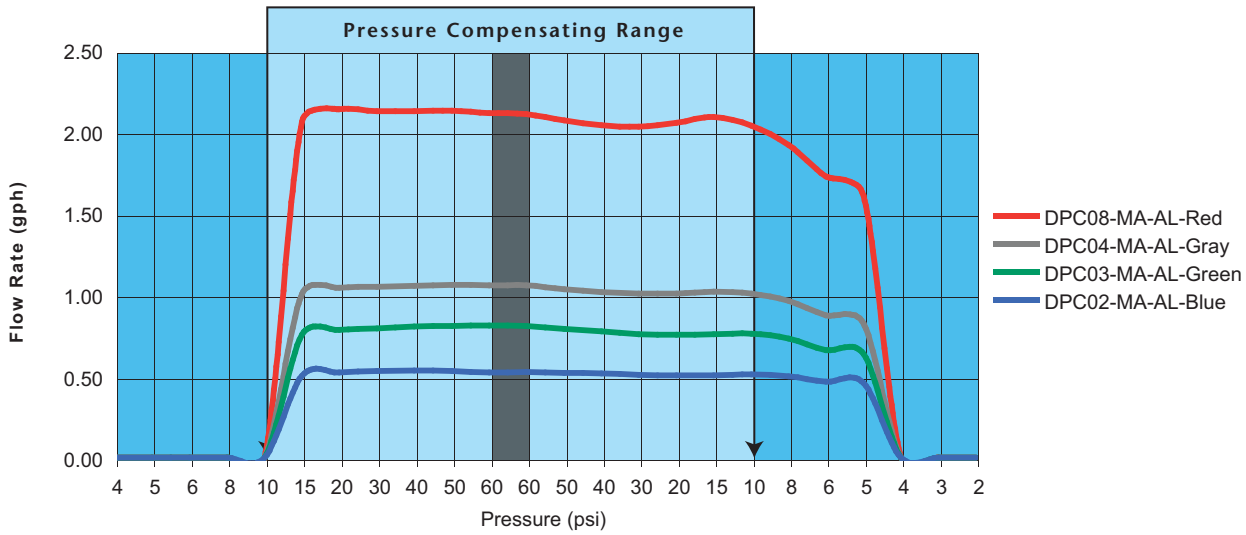
The exceptional emitter design allows uniform flow rates in demanding applications
Even in nurseries and greenhouses where exceptional precision is required. The pressure compensating feature, along with a manufacturing Cv of 3% or less makes the NGE one of the highest performing emitters available.

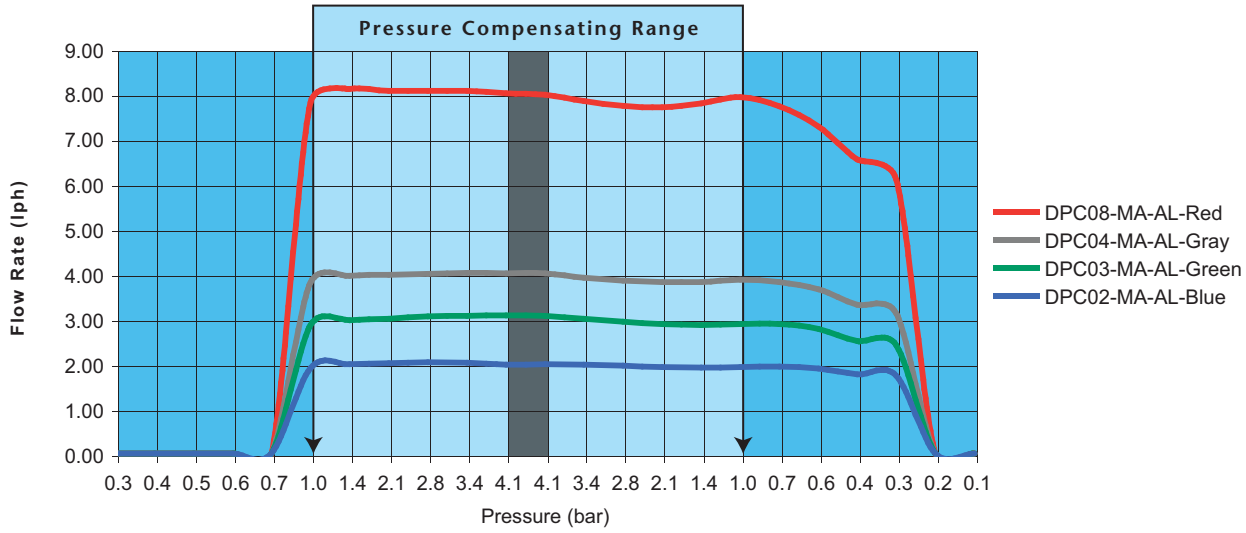
Also available in a male adapter (-MA) outlet
Configuration with an internal bug shield, allowing use with 1/4" (4mm) leader tubes or Black Spider multi-outlet devices.

Available in four flow rates:

DPC02-MA-AL-Blue	0.5 gph	2.0 lph
DPC03-MA-AL-Green	0.8 gph	3.0 lph
DPC04-MA-AL-Gray	1.0 gph	4.0 lph
DPC08-MA-AL-Red	2.1 gph	8.0 lph

FLOW RATE





SPECIFICATIONS

Nominal Flow Rates (Q)	DPC02	DPC03	DPC04	DPC08
gph	0.5	0.8	1.0	2.1
lph	2.0	3.0	4.0	8.0
Recommended Pressure Range (P)				
psi	13 to 60 psi			
bar	0.9 to 4.1 Bar			
Closing Pressure				
psi	3.5	4	4.5	5
bar	0.24	0.28	0.34	0.34
Emitter Specs				
Emitter Exponent (x)	0.000			
Coefficient of variation (Cv)	≤ 3%			
Minimum Filtration Requirement				
Mesh	140			
Micron	105			
Color	Light Blue	Light Green	Gray	Light Red

Understanding Part Numbers

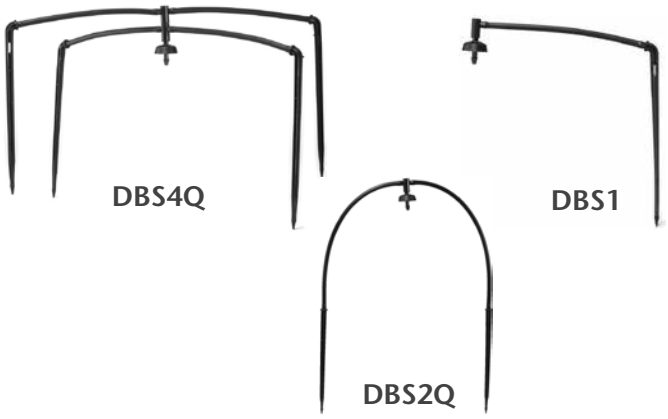
Example: DPC04-MA-AL-Gray

DPC 04 -MA AL -Gray

- DPC — Model
- 04 — Flow Rate (lph)
- -MA — MA = Male Adapter, DC = Dust Cap
- AL — AL = Anti Drain
- -Gray — Color (Base)
- MA / AL — Outlet Configuration

Black Spiders & White Spiders

Multi-outlet device for NGE emitters



The Black Spider and White Spider add-on assemblies are ideal for allowing additional distribution to an on-line emitter. The Black Spider or white spider, in combination with our NGE-AL anti-drain PC emitter, are ideal for greenhouses and nurseries where pot watering and/or hanging basket irrigation systems are used.

FEATURES & BENEFITS

Easy to install
On the NGE Self Flushing (SF) or Anti Leak (AL) emitters equipped with a Male Adaptor (MA), as well as other emitters with a 1/4" (4mm) male spigot outlet.

Available in 18" (45.7 cm), 24" (61 cm) and 32" (81.3 cm)

Less disease
By applying water directly to the pot, the foliage will stay dry, decreasing the possibility of disease.

Decrease run-off contamination
Daily watering does not wash off chemicals applied to the foliage

Higher water and fertilizer uniformity
If used in combination with our NGE AL, pressure compensating dripper with anti drain device.

Modular configuration: 1, 2 and 4 outlet
Provides for a 2-outlet manifold, different configurations that can be produced on a multiple of 2.

MODELS

Black Spider part#	White Spider part#	Description
DBS1-XX	**DWS1-XX**	**Single outlet elbow configuration with barbed elbow stake**
DBS1S-XX	**DWS1S-XX**	**Single outlet straight configuration with barbed elbow stake**
DBS2Q-XX	**DWS2Q-XX**	**Two outlet configuration with turbulent elbow stakes**
DBS2S-XX	**DWS2S-XX**	**Two outlet configuration with turbulent straight stakes**
DBS4Q-XX	**DWS4Q-XX**	**Four outlet configuration with turbulent elbow stakes**
DBS4S-XX	**DWS4S-XX**	**Four outlet configuration with turbulent straight stakes**

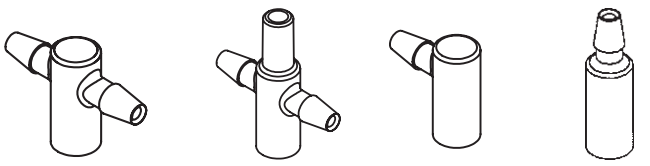
XX denotes the length of the micro-tube in inches. Substitute XX with the following available micro-tube lengths: 18", 24", 32" and 36". **Example: DBS1-18**

NOTES: • 6 and 8 outlet configurations can be produced on request. Call for additional information.

• The emitter must be inserted into the female adaptor at least half the length of the emitter's male adaptor to insure a positive fit.

ACCESSORIES

FBS1E	1 outlet barbed elbow x female adaptor
FBS1S	1 outlet barbed straight x female adaptor
FBS2	2 outlet barbed tee x female adaptor
FBS2-MA	2 outlet barbed manifold x female/male adaptor
IPS0301	Turbulent flow straight stake
IPS0301BQ	Barbed elbowed stake
IPS0301Q	Turbulent flow elbowed stake
IPS0301BQ-BLUE	Barbed elbow stake
IPS0301BQ-RED	Barbed elbow stake



Turbo-SC Plus & Turbo-Key

Ideal PC (Pressure Compensating) & Non-Pressure Compensating emitters for use in agriculture, nursery & landscaping applications. The large turbulent flow path allows for greater resistance to plugging, and the take-apart feature permits easy on-site inspection and cleaning.

FEATURES & BENEFITS

- Proven PC (Pressure Compensating) & Non-Pressure Compensating emitter design
- Take-apart feature permits fast, easy on-site inspection and cleaning
- Barbed inlet allows emitters to be installed directly onto hose or used with 1/4" (4mm) tubing
- Resistant to agricultural chemicals and ultraviolet light degradation

TURBO-SC PLUS EMITTER: PRESSURE COMPENSATING

- Large, self-flushing, turbulent flow path* for higher resistance to plugging where water conditions may be a problem
- High quality silicon diaphragm for improved pressure compensation and uniformity over a wide range of pressures
- Includes a Male Adaptor for use with 1/4" (4mm) tubing (i.e. EHD0433)
- Includes bug shield to deter entry of insects
- Available in three flow rates:

Part Number	GPH	LPH	Base Color
DPJ02-A	0.5	2.0	Blue
DPJ04-A	1.0	4.0	Black
DPJ08-A*	2.0	8.0	Red

*Turbo-SC has same features as Turbo-SC Plus except for Turbulent Flow Path

TURBO-KEY NON-PRESSURE COMPENSATING EMITTER

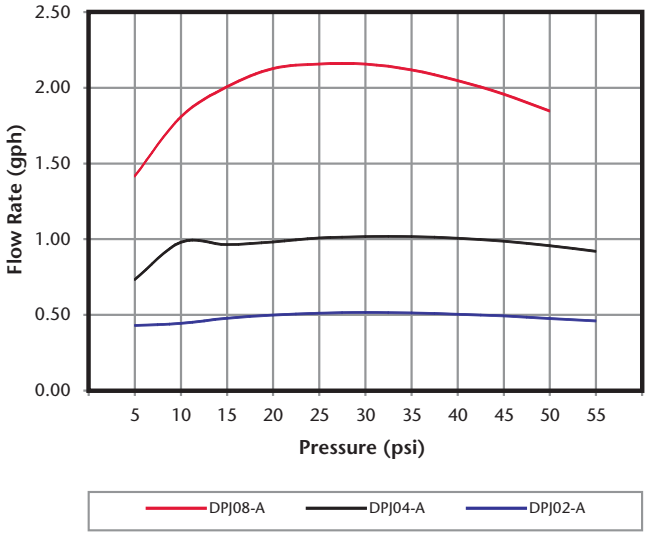
- Large turbulent flow path allows for greater resistance to plugging where water conditions are poor.
- Color coded internal tab for easy flow rate identification
- Available in three flow rates:

Part Number	GPH	LPH	Internal Tab Color
DNK02-3	0.5	2.0	White
DNK04-3	1.0	4.0	Black
DNK08-3	2.0	8.0	Green

TURBO-SC PLUS: PRESSURE COMPENSATING

Pressure		DPJ02-A		DPJ04-A		DPJ08-A	
psi	Bar	gph	lph	gph	lph	gph	lph
5	0.34	0.42	1.60	0.73	2.75	1.41	5.34
10	0.69	0.44	1.65	0.97	3.68	1.80	6.81
15	1.03	0.47	1.78	0.96	3.62	2.00	7.57
20	1.38	0.49	1.86	0.97	3.69	2.12	8.03
25	1.72	0.50	1.91	1.00	3.79	2.15	8.14
30	2.07	0.51	1.93	1.01	3.82	2.15	8.14
35	2.41	0.51	1.91	1.01	3.82	2.11	7.99
40	2.76	0.50	1.88	1.00	3.78	2.04	7.72
45	3.10	0.49	1.84	0.98	3.71	1.95	7.38
50	3.45	0.47	1.78	0.95	3.60	1.84	6.97

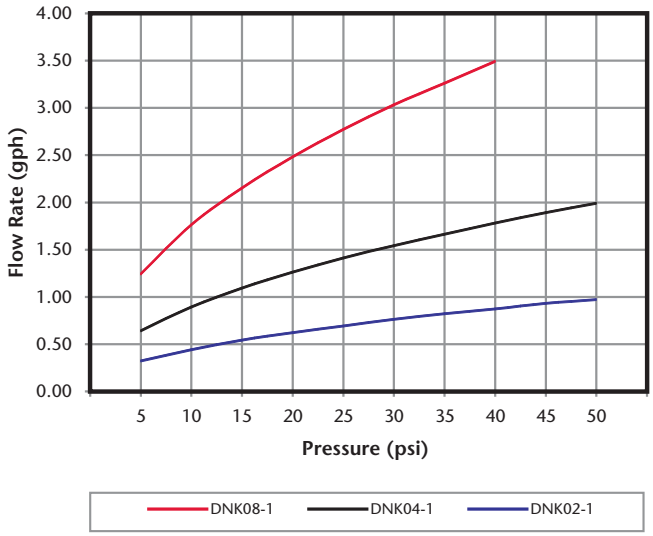
Nominal Flow Rates (Q)	DPJ02-A	DPJ04-A	DPJ08-A
gph	0.5	1.0	2.0
lph	2.0	4.0	8.0
Recommended Pressure Range (P)			
psi	10 to 50 psi		
bar	0.7 to 3.5 Bar		
Emitter Exponent (x)			
	0.060	0.009	0.031
Recommended Filtration Requirement			
Mesh	140		
Micron	105		
Option Color (base)	Blue	Black	Red



TURBO-KEY: NON-PRESSURE COMPENSATING

Pressure		DPJ02-A		DPJ04-A		DPJ08-A	
psi	Bar	gph	lph	gph	lph	gph	lph
5	0.34	0.42	1.60	0.73	2.75	1.41	5.34
10	0.69	0.44	1.65	0.97	3.68	1.80	6.81
15	1.03	0.47	1.78	0.96	3.62	2.00	7.57
20	1.38	0.49	1.86	0.97	3.69	2.12	8.03
25	1.72	0.50	1.91	1.00	3.79	2.15	8.14
30	2.07	0.51	1.93	1.01	3.82	2.15	8.14
35	2.41	0.51	1.91	1.01	3.82	2.11	7.99
40	2.76	0.50	1.88	1.00	3.78	2.04	7.72
45	3.10	0.49	1.84	0.98	3.71	1.95	7.38
50	3.45	0.47	1.78	0.95	3.60	1.84	6.97

Nominal Flow Rates (Q)	DNK02-1	DNK04-1	DNK08-1
gph @ 15 psi	0.5	1.0	2.0
lph @ 1 bar	2.0	4.0	8.0
Recommended Pressure Range (P)			
psi	0 to 50 psi		
bar	0 to 3.5 Bar		
Emitter Exponent (x)			
	0.49	0.50	0.50
Minimum Filtration Requirement			
Mesh	140		
Micron	105		
Color (internal tab)	White	Black	Green



E-2® Emitter

Ideal Classic® emitter for short runs and non-sloped ag, nursery & landscape applications. Suitable for seedling, young and established plantings where precision water placement is required. Its take apart feature and large open flow path allows easy field inspection, maintanance and greater resistance to plugging.

SPECIFICATIONS

Nominal Flow Rates (Q)	DBK04	DBK08	DBK16
gph @ 15 psi	1	2	4
lph @ 1 bar	4	7	15
Recommended Pressure Range (P)			
psi	0 to 50 psi		
bar	0to 3.5 Bar		
Emitter Exponent (x)			
Emitter Exponent (x)	0.60	0.57	0.56
Coefficient of Variation (Cv)	≤ 5%	≤ 6%	≤ 6.5%
Minimum Filtration Requirement			
Mesh	140		
Micron	115		

Understanding Part Numbers

Example: DBK04-RED

DBK 04

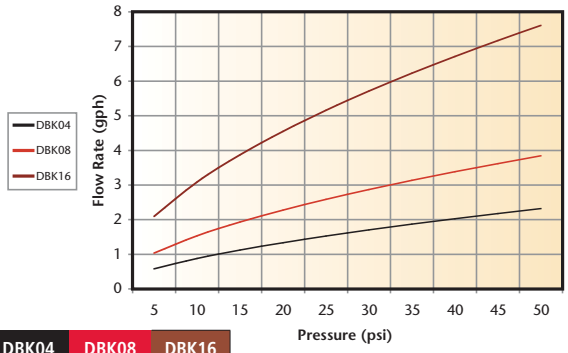
- DBK — E-2 Emitter
- 04 — Nominal Flow Rate (lph)

FEATURES & BENEFITS

- Proven Classic® (non-pressure compensating) hydraulic design
- Fast, single-barb installation directly onto the hose
- Exit barb may be used with 1/4" (4mm) Leader Tube (P/N EHD0433) for precision water placement
- Large open flow path for resistance to plugging
- Take apart feature allows fast, simple field inspection
- Optional color coded base for easy on-site identification
- Available in three flow rates:

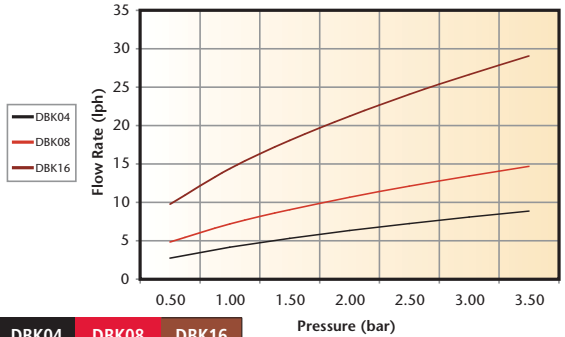
DBK04	1.0 gph	(4.0 lph)
DBK08	2.0 gph	(8.0 lph)
DBK16	4.0 gph	(16.0 lph)

FLOW RATE IN GPH



PSI	DBK04	DBK08	DBK16
5	0.58	1.03	2.09
10	0.88	1.53	3.08
15	1.12	1.93	3.87
20	1.33	2.27	4.55
25	1.52	2.58	5.15
30	1.70	2.87	5.71
35	1.87	3.13	6.23
40	2.03	3.38	6.71
45	2.17	3.62	7.17
50	2.32	3.84	7.61

FLOW RATE IN LPH



Bar	DBK04	DBK08	DBK16
0.50	2.73	4.82	9.74
1.00	4.15	7.17	14.38
1.50	5.31	9.04	18.05
2.00	6.31	10.65	21.21
2.50	7.22	12.10	24.04
3.00	8.07	13.43	26.63
3.50	8.85	14.66	29.04

Fogger

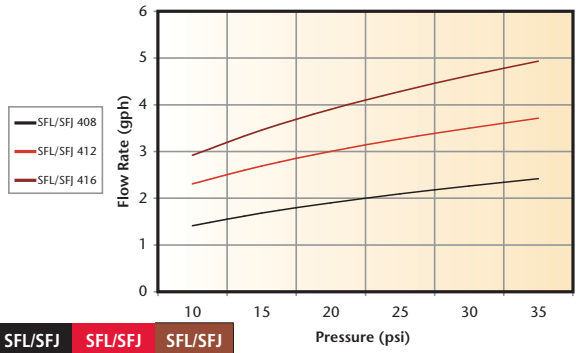
The Fogger is ideal for irrigating nurseries, shrubs and trees where a fine mist spray is required at low volumes and low pressures. Foggers can also assist in temperature control and to increase humidity in hot, dry climates. Its rugged nylon construction and easy disassembly allows for carefree operation.

FEATURES & BENEFITS

- Proven hydraulic (vortex) design
- Recommended Operating Pressure: 20 psi. (2,25 Bar)
- Diameter of throw (approximately) 2 to 5 Ft. (0,6 to 1,5 meters)
- Rugged Nylon construction with no moving parts
- Both barbed (SFJ) and 1/8" threaded (SFL) connections available
- Both versions disassemble for easy servicing
- Barbed Fogger (SFJ4xx) attaches directly onto LLDPE Hose or 1/4" (4mm) Micro-Distribution Hose (EHD0437) and can be used with Locator Stake (IPS0104)
- 1/8"NPT Threaded Fogger (SFL4xx) attaches directly to 1/8" Threaded Connection or Threaded Fogger Stake (IPS0409)
- Available in four flow rates:

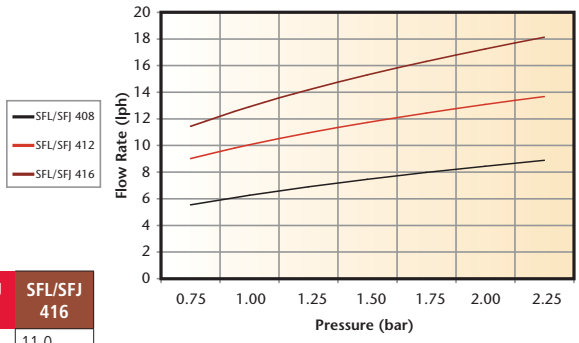
SFL/SFJ 408	2 gph	(8 lph)
SFL/SFJ 412	3 gph	(12 lph)
SFL/SFJ 416	4 gph	(16 lph)

FLOW RATE IN GPH



PSI	SFL/SFJ 408	SFL/SFJ 412	SFL/SFJ 416
10	1.4	2.3	2.9
15	1.7	2.7	3.4
20	1.9	3.0	3.9
25	2.2	3.2	4.3
30	2.3	3.4	4.6
35	2.4	3.7	4.9

FLOW RATE IN LPH



Bar	SFL/SFJ 408	SFL/SFJ 412	SFL/SFJ 416
0,68	5,3	8,6	11,0
1,00	6,4	10,1	12,7
1,25	6,9	11,0	14,1
1,50	7,6	11,7	15,4
1,75	8,4	12,2	16,4
2,00	8,7	12,7	17,2
2,25	8,9	13,4	18,0

SPECIFICATIONS

Nominal Flow Rates (Q)	SFL/SFJ 408	SFL/SFJ 412	SFL/SFJ 416
gph	2	3	4
lph	8	12	16
Recommended Pressure Range (P)			
psi	10 to 35 psi		
bar	0.75 to 2.25 Bar		
Emitter Exponent (x)			
Emitter Exponent (x)	0.43	0.38	0.42
Recommended Filtration Requirement			
Mesh	200		
Micron	74		

Understanding Part Numbers

Example: SFL4081

SFL4 08 1
- 1: Optional Threaded Stake
- 08: Nominal Flow Rate (lph)
- SFL4: SFJ4 Barbed Fogger; SFL4 Threaded Fogger

Micro-Sprinkler VI Classic

The Micro-Sprinkler VI Classic has been engineered to provide uniform water application for under-tree and over-head applications in orchards, vineyards and nurseries.

Understanding Part Numbers

Example: SAM620-D36

SAM 620 -D XX
- XX: Assembly lead length
- -D: Add -D for break-off deflector tab
- 620: Nozzle Number
- SAM: Model

FEATURES & BENEFITS

- Deflector plate design maximizes start-up torque to ensure reliability of operation in the most hostile environments
- Anti-insect/dust-proof spinner retracts to protect nozzle when not in operation
- New snap-fit conical bearing design ensures long life, ease of maintenance and trouble free spinning
- Available in 8 color coded nozzle flow rates for easy identification
- Low angle of throw and large droplet size to maximize under foliage penetration and reduce susceptibility to windy conditions
- Balanced spin rate to minimize stake vibration
- Double G-frame design provides long life under harsh field conditions
- Constructed of durable, weather resistant, engineering grade materials and manufactured under stringent quality control conditions
- Engineered to provide uniform water application for low volume, under-tree and over-head installations
- Easy installation on bases, risers and stakes, as well as suspension from trellis wire
- Optional break-off deflector tab allows the sprinkler to be placed near young trees to concentrate water where the roots are developing

SPECIFICATIONS

- Recommended operating pressure - 20 psi (1.38 Bar)
- Available in 8 flow rates ranging from 9.1 to 65.1 gph (34.5 to 246.5 lph) at 20 psi (1.38 Bar)
- Diameter of throw 16.4 to 36.8 Feet (5 to 11.2 Meters)
- Available in 3/8" MPT inlets

MATERIALS

- Frame, Bearing & Nozzle - Acetal; Spinner - Nylon

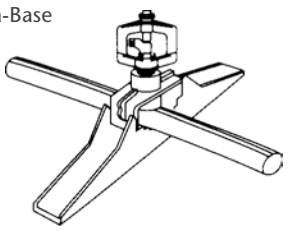
PERFORMANCE CHART

Model	with Deflector tab Model No.	Nozzle Color	Orifice Dia. Inch (mm)	Pressure		Flow rate		Diameter		Diameter with Deflector Tab		Stream Height	
				PSI	Bar	gph	lph	Feet	Meters	Feet	Meters	Feet	Meters
SAM610	SAM610-D	Black	0.034 (0.86)	15	1.03	7.9	29.9	16.4	5.0	4.9	1.5	1.8	0.56
				20	1.38	9.1	34.4	17.7	5.4	5.3	1.6	2.0	0.62
				25	1.72	10.2	38.6	19.0	5.7	5.8	1.7	2.1	0.65
SAM613	SAM613-D	White	0.041 (1.04)	15	1.03	11.8	44.7	20.5	6.2	6.2	1.9	1.8	0.56
				20	1.38	13.7	51.9	22.4	6.8	6.7	2.0	2.0	0.62
				25	1.72	15.3	57.9	24.0	7.3	7.2	2.2	2.1	0.65
SAM614	SAM614-D	Maroon	0.049 (1.24)	15	1.03	16.5	62.5	23.0	7.0	6.9	2.0	1.9	0.57
				20	1.38	19.0	71.9	25.0	7.6	7.5	2.3	2.3	0.71
				25	1.72	21.2	80.3	27.5	8.4	8.3	2.5	3.0	0.90
SAM616	SAM616-D	Green	0.055 (1.40)	15	1.03	21.5	81.4	27.0	8.2	8.1	2.5	2.0	0.60
				20	1.38	24.8	93.9	30.0	9.1	9.0	2.7	2.7	0.83
				25	1.72	27.8	105.2	31.6	9.6	9.5	2.9	3.0	0.90
SAM620	SAM620-D	Blue	0.065 (1.65)	15	1.03	29.2	110.5	30.0	9.1	9.0	2.7	2.0	0.60
				20	1.38	33.7	127.6	32.2	9.8	9.7	3.0	2.6	0.80
				25	1.72	37.7	142.7	34.6	10.5	10.4	3.2	3.0	0.92
SAM622	-	Grey	0.071 (1.80)	15	1.03	33.8	127.9	32.0	9.8	-	-	2.0	0.60
				20	1.38	39.0	147.6	34.0	10.4	-	-	2.5	0.77
				25	1.72	43.6	165.0	35.6	10.9	-	-	3.0	0.90
SAM624	-	yellow	0.079 (2.01)	15	1.03	41.7	157.9	32.5	9.9	-	-	2.1	0.65
				20	1.38	48.1	182.1	35.0	10.7	-	-	2.5	0.75
				25	1.72	53.8	203.7	36.8	11.2	-	-	2.8	0.85
SAM628	-	Red	0.091 (2.31	15	1.03	56.4	213.5	32.0	9.8	-	-	2.4	0.74
				20	1.38	65.1	246.4	34.1	10.4	-	-	3.2	0.97
				25	1.72	72.8	275.6	36.8	11.2	-	-	3.4	1.05

· Diameters are quoted according to ASAE S398.1. Actual diameter may exceed quoted Diameter
· Assemblies for SAM610 thru SAM620 will include Micro-Sprinkler; IPS1004 Stake; 4mm Leader Tube 24", 30", 36" or 48" Length and 4mm Coupling.
· Assemblies for SAM622 thru SAM628 will include Micro-Sprinkler; IPS1006; 6mm Leader Tube 24", 30", 36" or 48" Length and 6mm Coupling.

STA-BASE:

The Toro Micro-Sprinkler VI can be connected to 10mm to 20mm Blue Stripe round hose using a Sta-Base with 3/8" FPT x 1/4" barb

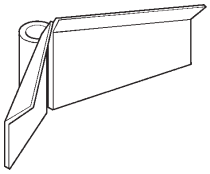


STAKE ASSEMBLIES:

The Toro Micro-Sprinkler VI is available assembled on a 3/8" FPT x 4mm/6mm barb x 12" length stake, 4mm/6mm leader tube 24", 30", 36" or 48" length and 4mm/6mm Coupling

ACCESSORIES:

Optional 180 Deg Red or Black Deflectors, Red or Black Stakes, Sta-Bases and Adaptors are available



Micro Sprinkler PC

Pressure Compensating

Toro's pressure compensating Micro Sprinkler PC is specifically designed for orchards, vineyards, and nursery applications where undulating terrain and long lateral lengths are challenging. Its unique pressure compensating design provides uniform flows and diameters over a wide range of operating pressures. The Micro Sprinkler PC now has a wider diameter of throw than Toro's previous micro sprinklers.

FEATURES & BENEFITS

- Wide diameter of throw from 16 feet to 31 feet, depending on sprinkler
- Pressure compensating sprinkler provides uniform flow over a wide range of operating pressures: 20 psi – 60 psi
- Low angle of throw for maximizing under foliage irrigation
- Easy identification in eight color coded flow rates ranging from 9 GPH – 40 GPH
- Snap-fit bearing provides easy field inspection and maintenance
- Improved distribution characteristics with large droplet size, less susceptible to wind
- Anti-insect/dust proof spinner retracts to protect nozzle when not in operation
- Optional break off deflector tab allows the sprinkler to be placed near a newly planted tree to concentrate water where the roots are developing
- Fully assembled models available with pre-installed tube and stake

SPECIFICATIONS

Inlet: 3/8" MPT (10 mm MBSP/ NPT)

Materials: Frame, bearing, and nozzle: Acetal.
Spinner: Nylon. Diaphragm: Rubber.

Assemblies:
Use 4 mm tube and stake (IPS1004)

Recommended Operating Pressure: 20 psi – 60 psi

PERFORMANCE CHART

Model	With Deflector Tab No.	Nozzle Color	Pressure		Flow Rate		Diameter		Diameter with Deflector Tab	
			Psi	Bar	gph	lph	Feet	Meters	Feet	Meters
MS7PC9	MS7PC9D	Black	20	1.38	9.0	34	15.7	4.8	0.98	0.3
			30	2.07	9.8	37	19.7	6.0		
			40	2.76	9.2	35	19.0	5.8		
			50	3.45	9.5	36	18.4	5.6		
			60	4.14	9.8	37	19.7	6.0		
MS7PC12	MS7PC12D	Lt-Blue	20	1.38	11.6	44	18.4	5.6	1.64	0.5
			30	2.07	13.2	50	23.0	7.0		
			40	2.76	12.2	46	21.0	6.4		
			50	3.45	12.4	47	21.7	6.6		
			60	4.14	12.7	48	22.3	6.8		
MS7PC15	MS7PC15D	White	20	1.38	13.7	52	18.4	5.6	2.30	0.7
			30	2.07	15.3	58	22.3	6.8		
			40	2.76	14.8	56	21.0	6.4		
			50	3.45	15.6	59	23.0	7.0		
			60	4.14	15.9	60	23.6	7.2		
MS7PC20	MS7PC20D	Maroon	20	1.38	18.8	71	22.3	6.8	2.30	0.7
			30	2.07	20.3	77	25.6	7.8		
			40	2.76	19.3	73	23.6	7.2		
			50	3.45	19.6	74	24.3	7.4		
			60	4.14	20.1	76	24.3	7.4		
MS7PC26	MS7PC26D	Green	20	1.38	24.6	93	24.9	7.6	2.30	0.7
			30	2.07	26.2	99	27.6	8.4		
			40	2.76	24.8	94	25.6	7.8		
			50	3.45	25.6	97	26.9	8.2		
			60	4.14	26.7	101	28.2	8.6		
MS7PC31	MS7PC31D	Purple	20	1.38	30.6	116	26.9	8.2	2.30	0.7
			30	2.07	30.9	117	27.6	8.4		
			40	2.76	29.3	111	23.6	7.2		
			50	3.45	30.4	115	24.9	7.6		
			60	4.14	31.4	119	24.9	7.6		
MS7PC35	MS7PC35D	Blue	20	1.38	34.3	130	28.2	8.6	2.62	0.8
			30	2.07	36.2	137	30.2	9.2		
			40	2.76	33.8	128	26.9	8.2		
			50	3.45	35.1	133	28.9	8.8		
			60	4.14	36.5	138	30.8	9.4		
MS7PC40	MS7PC40D	Grey	20	1.38	38.6	146	26.2	8.0	3.28	1.0
			30	2.07	40.7	154	28.2	8.6		
			40	2.76	38.0	144	26.2	8.0		
			50	3.45	39.1	148	26.9	8.2		
			60	4.14	40.7	154	28.2	8.6		

The latest generation Micro Sprinkler PC pressure compensating sprinkler is suitable for various applications, including under tree irrigation, overhead irrigation, vegetables, vineyard, orchards and greenhouse applications. This innovative micro sprinkler can also be used for overhead frost protection.

The diverse Micro Sprinkler PC range delivers a spray pattern that suits a wide range of crops to meet growers' needs.

Micro-Sprinkler Accessories

STAKES & STAKE ASSEMBLIES

Part Number	Description
Stakes for Foggers	
IPS0409	4mm Barbed Fogger Stake - Black
Stakes for Snap-Jets	
IPS0400	Clip Stake - Black
IPS0401	Clip Stake - Red
IPS0403	1/4" Barbed Stake x 10-32 UNF (self-tapping threads) for Snap-Jets - Black
IPS0405	Jet Stake suitable for 4mm – 5mm tubing - Black
4mm Barb Stake Assemblies for Snap-Jet (Black) with Leader Tube & 4mm Take-Off	
IPS040324	24" Length
IPS040330	30" Length
IPS040336	36" Length
IPS040348	48" Length
Stakes for Micro-Sprinkler	
IPS1004	3/8"FPT x 4mm or 6mm Barbed Stake - Black
IPS1004-1	3/8"FPT x 4mm or 6mm Barbed Stake - Red
IPS1006	3/8"FPT x 6mm Barbed Stake - Black
IPS1006-1	3/8"FPT x 6mm Barbed Stake - Red

Part Number	Description
3/8"FPT x 4mm Barb Stake Assembly (Black) for Micro- Sprinkler with Leader Tube & 4mm Take-Off	
IPS100424	24" Length
IPS100430	30" Length
IPS100436	36" Length
IPS100448	48" Length
3/8"FPT x 6mm Barb Stake Assembly (Black) for Micro- Sprinkler with Leader Tube & 4mm Take-Off	
IPS100624	24" Length
IPS100630	30" Length
IPS100636	36" Length
IPS100648	48" Length
Sta-Base for Micro-Sprinkler	
IPS1025	3/8"FPT Clamp & Sta-Base - Black (Unassembled)
SRP3299	Replacement 3/8"FPT Clamp for Sta-Base
SRP3300	Replacement Base for Sta-Base

Leader Tube With Take-Off

4mm ULDPE Leader Tube with 4mm Barbed Take-Off for 4mm Clip Stake	
HWF424	24" Length
HWF430	30" Length
HWF436	36" Length
4mm LLDPE Leader Tube with 4mm Barbed Take-Off for 4mm Barb Stake	
HWF324	24" Length
HWF330	30" Length
HWF336	36" Length
HWF348	48" Length
6mm LLDPE Leader Tube with 6mm Barbed Take-Off for 6mm Barb Stake	
HWF624	24" Length
HWF630	30" Length
HWF636	36" Length
HWF648	48" Length

Leader Tube

4mm ULDPE Leader Tube (0.153" ID x 0.259" OD x 0.053" Wall) for 4mm Clip Stake	
SFH0424	24" Length
SFH0430	30" Length
SFH0436	36" Length
4mm LLDPE Leader Tube (0.153" ID x 0.279" OD x 0.063" Wall) for 4mm Barb Stake	
SFH0324	24" Length
SFH0330	30" Length
SFH0336	36" Length
SFH0348	48" Length
6mm LLDPE Leader Tube (0.250" ID x 0.346" OD x 0.048" Wall) for 6mm Barb Stake	
SFH0624	24" Length
SFH0630	30" Length
SFH0636	36" Length
SFH0648	48" Length

Snap-Jet® II

The Snap-Jet II is a versatile, low maintenance jet for the use in orchards, vineyards and greenhouses. With a choice of 8 snap-fit spray patterns and 7 flow rates, it easily accommodates various crops, growth stages and soil types.

FEATURES & BENEFITS

- Improved easy grip snap-fit deflector plate – Facilitates easy spray pattern change, maintenance and cleaning
- Available in 8 different spray patterns – Ensures precise water placement for efficiency and water conservation; easily adaptable to various crop growth stages and site conditions
- Available in 7 different flow rates – Accommodates varying crop water requirements and soil conditions
- Color-Coded Nozzles for easy on-site flow rate identification
- No moving parts makes the Snap Jet II less susceptible to clogging and general wear and tear
- Advanced heavy duty plastic construction provides maximum strength and durability, as well as high chemical & UV resistance
- 10-32 UNF (self tapping thread) connection for leak free positive fit
- Available with a Jet Stake that maintains spray pattern alignment with the plant's stem
- Complete assemblies available with: 12" (30cm) clip (IPS0400) or barb (IPS0403) stake; 24" (60cm), 30" (76cm), or 36" (90cm) leader tube; 1/4" (4mm) barb coupling

Understanding Part Numbers

Example: SJA40A03-36D

SJA 40 A 03 -36 D

- D: D-Barb stake assembly /C-Clip stake hose
- -36: Lead Length: 36" (90cm)
- 03: Last 2 digits of stake part number (03 = IPS0403)
- A: Splash Plate pattern letter
- 40: Orifice size of Jet Body (40 = .040" diameter)
- SJA: Prefix to represent Snap-Jet assembly

PERFORMANCE CHART

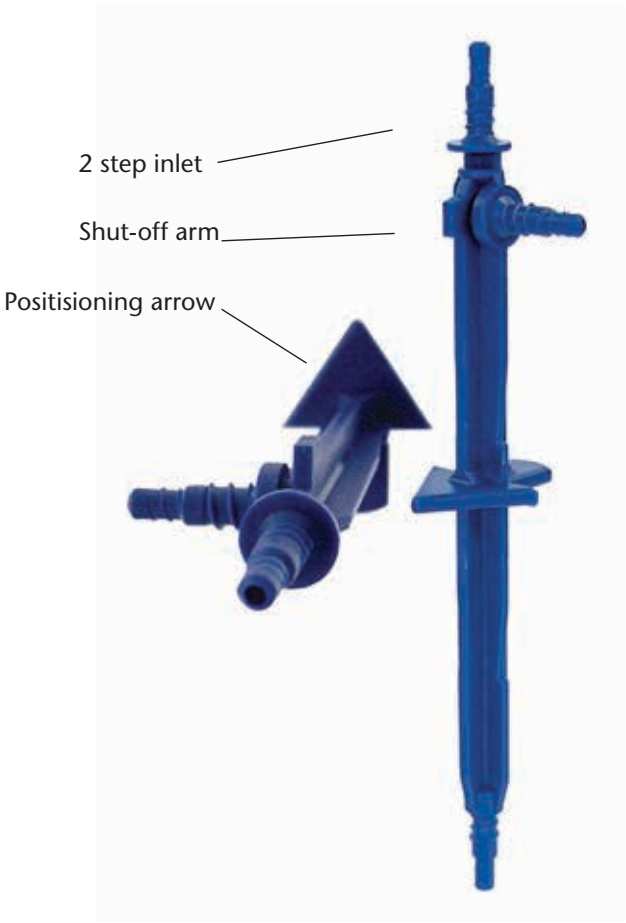
Spray Patterns: / Jet Trajectory:				A	B	C		D		E	F	H		J	
- High	24°														
- Standard	18°														
- Low	13°														
- Flat	0°														
Nozzle		Pressure	Flow Rate	Small Full Circle 360° x 16 streams	Large Full Circle 360° x 16 streams	Hi-Lo Full Circle 360° x 16 streams		Hi-Lo Part Circle 330° x 11 streams		Half Circle 180° x 9 streams	Deflector 360° solid	Hi-Lo Butterfly 2 x 120° 10 streams		Solid Butterfly 2 x 120° solid	
Model	Size / Color	psi	gph	Std Ft.	Std Ft.	Std Ft.	Flat Ft.	Hi Ft.	Lo Ft.	Std Ft.	Down Inch	Hi Ft.	Lo Ft.	Flat W x L Ft.	
SSJ30x	30 Black	10	4.2	7.8	8.8	5.7	7.8	7.8	9.9	3.5	16.0	11.3	12.0	6.7	9.1
		15	5.2	9.5	10.8	6.9	9.5	9.5	12.1	4.3	16.0	13.7	14.3	6.5	8.9
		20	6.0	11.0	12.5	8.0	11.0	11.0	14.0	5.0	16.0	13.0	14.0	5.2	9.2
		25	6.7	12.3	14.0	8.9	12.3	12.3	15.7	5.6	16.0	11.5	14.0	4.7	9.6
		30	7.3	13.5	15.3	9.8	13.5	13.5	17.1	6.1	16.0	10.8	14.8	4.7	10.2
SSJ35x	35 Orange	10	5.9	8.1	9.9	6.4	8.5	9.5	12.7	4.2	16.0	11.3	13.0	6.5	8.9
		15	7.3	10.0	12.1	7.8	10.4	11.7	15.6	5.2	16.0	13.0	13.3	5.2	10.3
		20	8.4	11.5	14.0	9.0	12.0	13.5	18.0	6.0	16.0	14.0	14.7	5.0	10.8
		25	9.4	12.9	15.7	10.1	13.4	15.1	20.1	6.7	16.0	13.3	16.0	4.7	11.1
		30	10.3	14.1	17.1	11.0	14.7	16.5	22.0	7.3	16.0	11.3	17.0	4.7	12.5
SSJ40x	40 Blue	10	7.6	8.5	11.0	7.1	9.2	13.3	15.2	4.9	16.0	14.8	15.3	7.0	9.4
		15	9.3	10.4	13.4	8.7	11.3	13.9	18.6	6.1	16.0	18.7	18.7	4.7	10.5
		20	10.7	12.0	15.5	10.0	13.0	16.0	21.5	7.0	16.0	19.7	21.0	4.5	11.6
		25	12.0	13.4	17.3	11.2	14.5	17.9	24.0	7.8	16.0	22.0	22.3	4.7	11.7
		30	13.1	14.7	19.0	12.2	15.9	19.6	26.3	8.6	16.0	22.0	22.7	4.8	12.1
SSJ45x	45 Purple	10	10.0	8.8	12.0	7.4	9.9	13.1	16.6	5.3	16.0	12.7	14.0	6.0	9.1
		15	12.2	10.8	14.7	9.1	12.1	16.0	20.4	6.5	16.0	16.0	16.7	4.0	11.1
		20	14.1	12.5	17.0	10.5	14.0	18.5	23.5	7.5	16.0	18.0	19.0	4.0	11.9
		25	15.8	14.0	19.0	11.7	15.7	20.7	26.3	8.4	16.0	20.0	21.0	4.2	11.9
		30	17.3	15.3	20.8	12.9	17.1	22.7	28.8	9.2	16.0	22.3	23.0	4.3	11.6
SSJ50x	50 Green	10	11.8	9.2	13.1	7.8	10.6	13.8	17.7	5.7	16.0	17.0	18.0	5.0	9.7
		15	14.5	11.3	16.0	9.5	13.0	16.9	21.7	6.9	16.0	21.0	22.7	4.7	11.0
		20	16.7	13.0	18.5	11.0	15.0	19.5	25.0	8.0	16.0	23.3	24.7	4.8	11.3
		25	18.7	14.5	20.7	12.3	16.8	21.8	28.0	8.9	16.0	25.3	27.7	5.0	12.2
		30	20.5	15.9	22.7	13.5	18.4	23.9	30.6	9.8	16.0	27.0	29.0	5.0	12.4
SSJ55x	55 Yellow	10	14.5	9.5	14.1	8.1	11.0	14.5	18.4	6.0	16.0	19.7	21.0	5.0	9.2
		15	17.8	11.7	17.3	10.0	13.4	17.8	22.5	7.4	16.0	22.7	25.0	5.7	10.0
		20	20.5	13.5	20.0	11.5	15.5	20.5	26.0	8.5	16.0	25.3	27.7	6.2	10.8
		25	22.9	15.1	22.4	12.9	17.3	22.9	29.1	9.5	16.0	29.3	31.3	6.5	11.1
		30	25.1	16.5	24.5	14.1	19.0	25.1	31.8	10.4	16.0	32.0	32.7	6.5	11.4
SSJ60x	60 Red	10	17.0	9.9	15.2	8.1	11.3	15.2	18.7	6.4	16.0	19.0	21.3	4.7	10.0
		15	20.8	12.1	18.6	10.0	13.9	18.6	23.0	7.8	16.0	22.7	28.0	4.8	10.8
		20	24.0	14.0	21.5	11.5	16.0	21.5	26.5	9.0	16.0	26.7	30.3	5.3	11.3
		25	26.8	15.7	24.0	12.9	17.9	24.0	29.6	10.1	16.0	31.3	33.3	5.3	11.6
		30	29.4	17.1	26.3	14.1	19.6	26.3	32.5	11.0	16.0	32.7	34.0	5.8	12.2

SPECIFICATIONS

Nominal Flow Rates (Q)	SSJ30x	SSJ35x	SSJ40x	SSJ45x	SSJ50x	SSJ55x	SSJ60x
gph	6.0	8.4	10.7	14.1	16.7	20.5	24.0
lph	22.71	31.80	40.50	53.37	63.22	77.60	90.85
Recommended Pressure Range (P)							
psi	0.5 to 30psi						
bar	0.3 to 2 bar						
Flow Exponent (x)	0.5						
Coefficient of variation (Cv)	5%						
Recommended Filtration Requirement							
Mesh	140	120	120	100	100	80	70
Micron	105	125	125	150	150	177	210

Pot Spray Stakes

Give every container in your nursery a consistent spray pattern and flow with the ONLY pot stake that acts like a jet.



FEATURES & BENEFITS

- Sets proper height of stake in pot
- The unique positioning arrow ensures that water sprays toward the plant
- Acts as an edge of pot locator
- 160° low angle spray pattern designed for round pots to reduce overspray
- Spray pattern works well from low to high water pressures and are available in 5.6 gph (21.2 lph), 10.5 gph (39.7 lph) and 16.0 gph (60.6 lph)
- Side arm shut-off with ring to give a watertight seal and keep dirt out of tubing
- Steep angle threads to easily lock tubing onto stake
- 2 step threaded inlet easily accommodates most popular PE and vinyl sizes
- With wide ribs and steps, the pot stake stays where you put it
- Traditional shut off stake end
- Made with durable U.V. inhibited resins

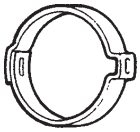
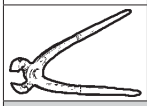
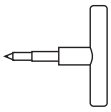
INSTALLATION TIPS

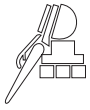
- Use PEVA micro-distribution hose EVR0332-250
- Directly insert the micro-hose into the Pot Sprayer stake by pushing and twisting. Cut the micro-hose to length desired at 45 degrees.
- Punch the lateral (use Blue Stripe Poly hose) with a 0.125 (4 mm) ID Hose punch. Insert the micro-hose directly into the lateral.

Part #	Description
IPS03BK	5.6 gph (21.2 lph) @ 20 psi (1.4 bar) 0.03" Orifice - Black
IPS03BL	10.5 gph (39.7 lph) @ 20 psi (1.4 bar) 0.04" Orifice - Blue
IPS03GR	16.0 gph (60.6 lph) @ 20 psi (1.4 bar) 0.05" Orifice - Green

Part Number: EVR0332-250

Tools & Accessories

HOSE ACCESSORIES		
Wire Ties & Wire Tie Handle		
	FWA01	Stainless Steel Wire Tie, 18 Gauge, 6" Long
	FWA02	Galvanized Steel Wire Tie, 18 Gauge, 6" Long
	FWA03	Stanless Steel Wire Tie, 18 Gauge, 7" Long
	FWA04	Stainless Steel Wire Tie, 18 Gauge, 8" Long
	FWA05	Galvanized Steel Wire Tie, 16 Gauge, 10" Long
	FMH08-1	Wire Tie Handle
Worm Gear Clamps		
	Clamp1.5	1.5" Worm Gear Clamp, Stainless Steel
	Clamp2	2" Worm Gear Clamp, Stainless Steel
	Clamp3	3" Worm Gear Clamp, Stainless Steel
	Clamp4	4" Worm Gear Clamp, Stainless Steel
	Clamp6	6" Worm Gear Clamp, Stainless Steel
	Clamp8	8" Worm Gear Clamp, Stainless Steel
Oetiker 1-Ear Clamps & Tool		
	WFL0040	(198R) Nominal Size 3/4", Closed .618", Open .779"
	WFL0042	(210R) Nominal Size 13/16", Closed .716", Open .827"
	WFL0043	(256R) Nominal Size 1", Closed .898, Open .1.008"
	WFL0044	(316R) Nominal Size 1 1/4", Closed 1.122", Open 1.244"
	WFL0045	(1098) Straight Jaw Pliers
Hose Punches		
	FMP16	Hose Punch to insert 4mm Barb Fitting, Stainless Steel
	FMP08	Hose Punch to insert 4mm Barb Fitting, Plastic / Steel
	FHP16	Oval Hose Punch, Steel

ADAPTORS & ACCESSORIES		
Adaptors		
	IPU1003	10-24 UNF x 3/8"MPT Reducing Adaptor
	IPU1510-1	3/8"FPT x 1/2"MPT Reducing Adaptor
	IPG10091	3/8"FPT x 4mm Barb Adaptor with 5mm Stake Insert
Gauges		
	GPP04	Air Chuck Adapter
	GPM0100	0-100 PSI Pressure Gauge, 1/4" MPT
Groove Connectors		
	ZCP9531-03	3" Grooved Connector
	ZCP9531-04	4" Grooved Connector

LEADER TUBE WITH TAKE-OFF		
	**4mm ULDPE Leader Tube with 4mm Barbed Take-Off for 4mm Clip Stake**	
	HWF424	24" Length
	HWF430	30" Length
	HWF436	36" Length
	4mm LLDPE Leader Tube with 4mm Barbed Take-Off for 4mm Barb Stake	
	HWF324	24" Length
	HWF330	30" Length
	HWF336	36" Length
	HWF348	48" Length
	6mm LLDPE Leader Tube with 6mm Barbed Take-Off for 6mm Barb Stake	
	HWF624	24" Length
	HWF630	30" Length
	HWF636	36" Length
	HWF648	48" Length

LEADER TUBE		
	**4mm ULDPE Leader Tube (0.153" ID x 0.259" OD x 0.053" Wall) for 4mm Clip Stake**	
	SFH0424	24" Length
	SFH0430	30" Length
	SFH0436	36" Length
	4mm LLDPE Leader Tube (0.153" ID x 0.279" OD x 0.063" Wall) for 4mm Barb Stake	
	SFH0324	24" Length
	SFH0330	30" Length
	SFH0336	36" Length
	SFH0348	48" Length
	6mm LLDPE Leader Tube (0.250" ID x 0.346" OD x 0.048" Wall) for 6mm Barb Stake	
	SFH0624	24" Length
	SFH0630	30" Length
	SFH0636	36" Length
	SFH0648	48" Length

Note: For Layflat Cutters, Layflat T-Handle Hex Tool, and 400 Series Barb Tool, see Pro-Loc Fittings.


Filters

Aqua-Clear™

Fiberglass Sand Filters

FEATURES & BENEFITS

- One-piece, fiberglass reinforced tank with a UV-resistant coating for years of dependable, corrosion-resistant service
- 75 psi pressure rating on all tank sizes
- Combination sand and water drain speeds servicing and winterizing
- All internal parts are threaded for ease of maintenance
- Swing-away water diffuser allows instant access to sand and all internal parts
- Can be installed as a single, dual, or multi-tank system
- Use no smaller than #20 crushed silica sand as media

Designed for drip irrigation systems operating up to 75 psi and 300 gpm, the Aqua-Clear fiberglass sand media filter is ideal for small to medium sized fields. Corrosion-resistant and lightweight fiberglass construction enables a quick and easy set up without the need for heavy equipment. And the valves enable easy backflushing when the filter gets dirty.

PART NUMBERS & SPECIFICATIONS

Easy access, heavy-duty closure with built-in pressure relief valve makes inspection and maintenance fast, safe, and easy

Threaded bulkhead connectors for easy installation and service

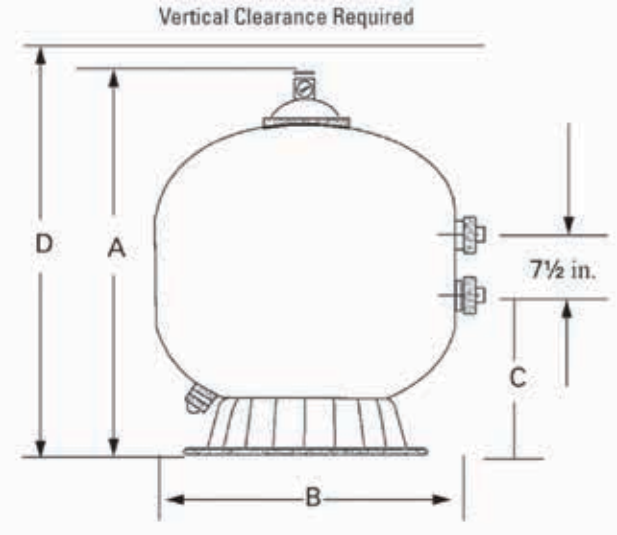
One-piece 75 psi fiberglass reinforced tank with UV-resistant surface finish

SPECIFICATIONS:

Part Number	Tank Size	Filtration Area (sq. ft.)	Flow Rate (gpm)	Minimum Backflush Flow (gpm)	Gravel Required (lbs.)	Sand Required (lbs.)	Carton Weight (lbs.)
AC-40	18 in.	1.92	48	29	50	125	26
AC-60	24 in.	3.14	79	47	50	275	42
AC-100	30 in.	4.91	123	74	150	450	66
AC-140	36 in.	7.06	177	106	275	650	76

DIMENSIONS:

MODEL	A DIM.	B DIM.	C DIM.	D DIM.
AC-40	30-1/2 in.	19-1/2 in.	10-3/4 in.	32-1/2 in.
AC-60	35-1/2 in.	24-1/2 in.	13-5/8 in.	36-3/4 in.
AC-100	39-3/4 in.	30-1/2 in.	16-1/4 in.	41-3/4 in.
AC-140	45-1/4 in.	36-1/2 in.	18-3/4 in.	47-1/4 in.



ACCESSORIES FOR MANUAL OPERATION:

Part Number	Description
AC-DV3P	2" PVC 3-Way Diverter Valve
AC-DV2P	2" PVC 2-Way Diverter Valve
AC-BHA2	2" Bulkhead Adapter (pair)
AC-STSV	Single Tank Backflush Valve (slide type)
AC-STMP	Single Tank Backflush Valve (multiport type)

2″ & 3″ Plastic Disc Filters

The 2″ & 3″ Plastic Disc Filters are designed for use as a primary or secondary filter, can be installed upright or downward, and is an ideal filter for water containing high amounts of organic or inorganic matter.

FEATURES & BENEFITS

Body constructed of glass reinforced Nylon.
Provides durability/reliability that will extend product life.

Two downstream exit ports
Filter can be installed in an angle or globe configuration, reducing the need to re-do piping.

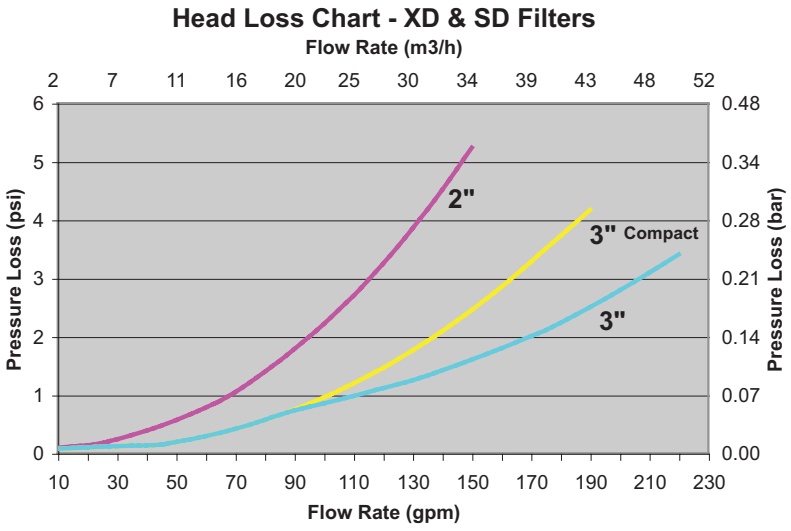
Specially designed disc rings (XD Models)
Provides greater surface area resulting in a longer time between cleanings, less filter maintenance and extended product life.

O-ring between cover and body
Prevents leakage.

Easy to tighten Ring-Nut
Saves time and provides a tight seal.

Pre-molded threaded holes for pressure gauges
Location to install pressure gauges to read up and downstream pressures.

FLOW RATE



PART NUMBERS & SPECIFICATIONS

Part #	2" Short Body Filter	2" Long Body Filter	3" Short Body Filter	3" Long Body Filter
XD Filter Part Number (NPT Thread)	IT-ABF50xx-3X-N	IT-ABF50xx-3XLN	IT-ABF75xx-3XSN	IT-ABF75xx-3X-N
XD Filter Part Number (BSP Thread)	IT-ABF50xx-3X	N/A	IT-ABF75xx-3XS	IT-ABF75xx-3X
SD Filter Part Number (NPT Thread)	IT-ABF50xx-3SN	IT-ABF50xx-3SLN	IT-ABF75xx-3SSN	IT-ABF75xx-3SN
XD Filtration Area	1,674 in2 (10,800 cm2)	2,790 in2 (18,000 cm2)	1,674 in2 (10,800 cm2)	2,790 in2 (18,000 cm2)
SD Filtration Area	186 in2 (1,200 cm2)	310 in2 (2,000 cm2)	186 in2 (1,200 cm2)	310 in2 (2,000 cm2)
Maximum Flow Rate	110 gpm (25 m3/h)	110 gpm (25 m3/h)	170 gpm (32 m3/h)	220 gpm (50 m3/h)
Maximum Pressure	145 psi (10 bars)			
Connection Size	2 in. (50 mm)	2 in. (50 mm)	3 in. (76 mm)	3 in. (76 mm)
Height	18.5 in. (470 mm)	30.9 in. (785 mm)	18.5 in. (470 mm)	30.9 in. (785 mm)
Width	10.8 in. (274 mm)	12.6 in. (320 mm)	10.8 in. (274 mm)	12.6 in. (320 mm)
Weight	14.1 lbs (6.4 kgs)	14.8 lbs (6.7 kgs)	15.0 lbs (6.8 kgs)	18.1 lbs (8.2 kgs)

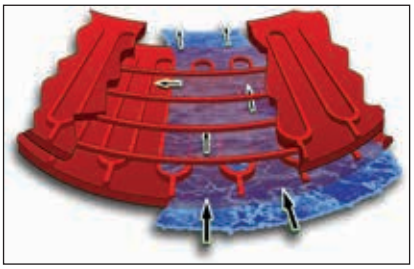
Note: To order, insert required mesh size in place of xx in Part number: 50 mesh = 50; 85 mesh = 85; 120 mesh = 12; 150 mesh = 15; 200 mesh = 20

Disc Ring Color				
Color	Mesh	Micron	XD	SD
Yellow	50	297	•	N/A
Gray	85	170	•	N/A
Blue	120	125	•	•
Red	150	100	•	•
Brown	200	75	•	N/A

DISC CHARACTERISTICS

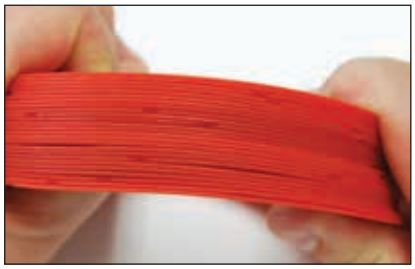
XD Disc Rings

- The specially designed two-sided disc ring features:
  - On one side, a sinusoidal (∿∿∿) disc pattern
  - And on the other side, grooves in concentric (◎)circles
- Both sides working together give a surface area that is unachievable by any other standard disc ring. This results in longer periods between cleanings, less filter maintenance and prolonged product life.
- Available in 50, 85, 120, 150, and 200 mesh.



SD Disc Rings

- Narrowing, cross-hatched grooves trap particles and debris between and on the outside of the disc rings:
  - Each side of the standard disc ring has opposite running tapered grooves, thereby creating an interweaving labyrinth among the discs.
- The standard disc rings press together and utilize the crosshatched groove design, allowing only clean water to flow through.
- Available in 120 and 150 mesh.



F-Series Plastic Filter

The F Series family of plastic Y filters offers superior performance and durability under demanding conditions. Filters are suitable as a primary or secondary filter. Screen filters are available in small and large bodies. Small body filters are ideal for tight installations and large body filters provide a larger filtration area. All these features make these filters ideal for agricultural, greenhouse and nursery applications.

FEATURES & BENEFITS

- Plastic Y filters are available in a 3/4", 1" and 1½" NPT
- Constructed of the highest quality plastics for durability and corrosion resistance
- Available in Plastic Disc and Stainless-Steel Screen
- 3/4" & 1" screen filters are available in small and large size bodies
- Easy element access for trouble-free maintenance
- 1/2" male thread outlet w/cap for quick flush cleaning
- Working pressure range 5 to 142 psi (at 73° F)
- Flow rate 5 to 80 gpm
- Body and cap constructed of nylon
- Locking ring constructed of glass reinforced nylon
- Element sealing guide
- O-ring constructed of Buna-N

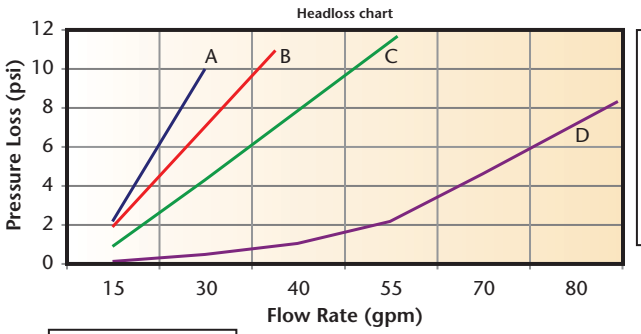
DIMENSIONS (INCHES)

Model	A	B	C
ALFD75150-L	9.00	7.32	4.29
ALFD10150-L	9.00	7.32	4.29
ALFD15150-L	9.00	7.32	4.29
ALFS75150-S	9.00	7.32	4.29
ALFS75150-L	9.00	7.32	4.29
ALFS10150-S	9.00	7.32	4.29
ALFS10150-L	9.00	7.32	4.29
ALFS15150-L	9.00	7.32	4.29

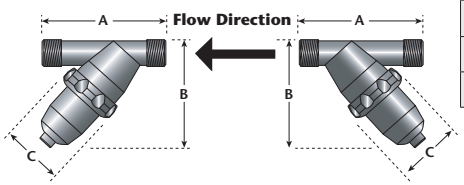
REPLACEMENT O-RING

Part Number	Body Size
1KLF2	Small Body
1KLG1	Large Body

"F" SERIES Y-FILTERS



1 ALFS75150-S
2 ALFD75150-L
ALFS75150-L
ALFS10150-S
3 ALFD10150-L
ALFS10150-L
4 ALFD15150-L
ALFS15150-L



MODELS WITH SIZES (MALE NPT)

Model	Size	Maximum Flow Rate	Element	Mesh	Body Size
Disc Filters					
ALFD75150-L	¾"	25 gpm	Disc	150	Large body
ALFD10150-L	1"	35 gpm	Disc	150	Large body
ALFD15150-L	1½"	80 gpm	Disc	150	Large body
Screen Filters					
ALFS75150-S	¾"	18 gpm	Screen	150	Small body
ALFS75150-L	¾"	25 gpm	Screen	150	Large body
ALFS10150-S	1"	25 gpm	Screen	150	Small body
ALFS10150-L	1"	35 gpm	Screen	150	Large body
ALFS15150-L	1½"	80 gpm	Screen	150	Large body

Model	Size	Element	Mesh	Body Size
Replacement Element				
AMP0004-4F	¾", 1" and 1½"	Disc	150	Large body
AMP0004-1S	¾" and 1"	Screen	150	Small body
AMP0004-2F	¾", 1" and 1½"	Screen	150	Large body


Valves

Bermad Valves

High-Performance Plastic Valves

Made from industrial grade, durable glass-filled nylon, Bermad plastic valves are engineered to withstand rough service conditions and are resistant to cavitation and chemical attack. The Y pattern valve body together with a one piece diaphragm provides a look through passage resulting in ultra high flow capacity and minimal friction loss.

FEATURES & BENEFITS

Lightweight construction
Easy to ship and move in portable irrigation systems

Chemically resistant engineered plastic
Provides long life in harsh environments and corrosive injection applications.

Remote control through a wide range of electric solenoids or hydraulic command
Saves labor and optimizes water application through accurate scheduling

Low friction losses
Reduced energy cost

Low flow and low pressure operation
Maintains peak uniformity in systems with flow and pressure variations

	Plastic	Manual	Electric	Pressure Reducing	Pressure Sustaining	Low Friction Loss	Low Maintenance
105 Series	•	•				•	•
110 Series	•	•	•			•	•
120 Series	•	•		•		•	•
12055 Series	•	•	•	•		•	•
130 Series	•	•			•	•	•

Hydraulic Control Metal Valves

At the leading edge of control valve design, Bermad metal valves combine simple and reliable construction with superior performance. The diaphragm performs under all service conditions with no distortion from uneven hydraulic forces or pressure surges. These automatic control valves are designed for operation in vertical and horizontal installations and can be configured to solve most irrigation control applications.

FEATURES & BENEFITS

Metal construction of the valve and pilots
Metal valves and compontents offer structural strength where long term reliability is essential

230 PSI operating pressure
Strength to withstand high pressure or water hammer risk

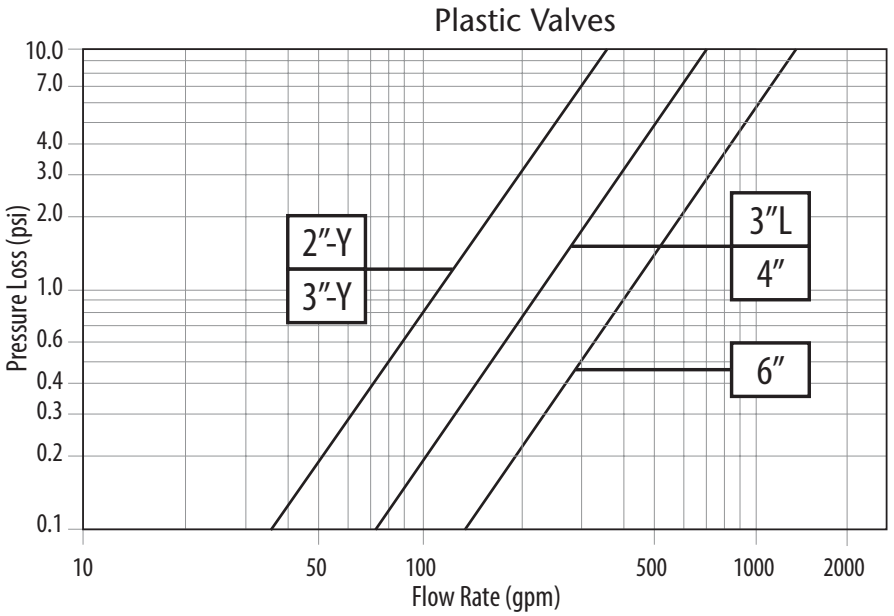
Remote control with a wide range of electric solenoid or hydraulic controls.
Saves labor and optimizes water application through accurate scheduling

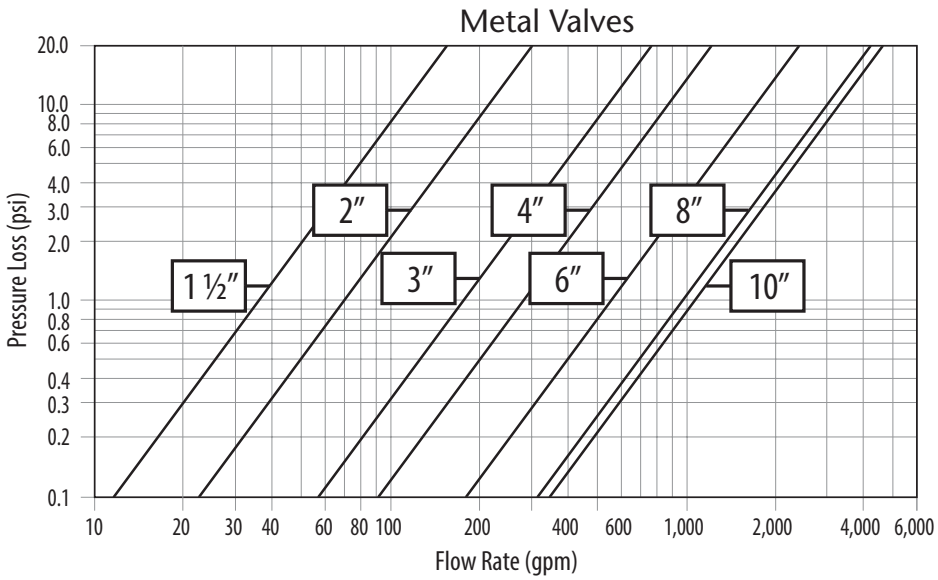
Available in sizes 1½" through 10"
Wide range of sizes and flows enables matching valves to system requirements

Stable regulation at low flows and high differential pressures
Enables system to operate at peak irrigation uniformity

	Plastic	Manual	Electric	Pressure Reducing	Pressure Sustaining	Low Friction Loss	Low Maintenance
405 Series	•	•				•	•
410 Series	•	•	•			•	•
420 Series	•	•		•		•	•
42055 Series	•	•	•	•		•	•
43Q Series	•				•	•	•

FRICTION LOSS DATA





VALVE PATTERNS AND END CONNECTION OPTIONS

Valve Size	Y- Y Pattern	A- Angle Pattern	NP- Thread	FF- Flanged	VI- Grooved	T3- 3" Glue End	T4- 4" Glue End
2"	Y		NP		VI		
2"L	Y		NP		VI		
3"	Y	A	NP				
3"L	Y	A	NP	FF	VI	T3	
4"	Y	A		FF	VI		T4
6"	Y			FF	VI		

* **T3** 3" Valve PVC Glue end connection are 3" female socket on the inside X 4" male spigot on the outside,
* **T4** 3"L and 4"PVC Glue end connections are 4" female socket on the inside. The outside is not compatible size.
* Not all available valve configuration and functions can be shown.
* For other valve configurations and application information please call.

Plastic Control Valves

Standard Configuration:

- Plastic Valve Y pattern (Y) and Angle (A) configuration
- Pressure Rating: Minimum operating 5 psi, Maximum inlet 145 psi
- Connections:
  - Threaded 2" thru 3" NPT (NP)
  - Plastic articulated flange 4" thru 6" (FF)
  - Grooved: 2" thru 6" (VI)
  - Glue End: 3L" and 4" (T3 or T4) normally closed (NC)
- 2" thru 6" valves are constructed using plastic tubing, fittings and plastic mini pilots
- 2" thru 3" valves have flow control stem
- Manual, electric and hydraulic valves are normally closed

105 SERIES Manual control, hydraulic actuation with3-way selector

Threaded-NPT (NP)	Flanged (NP)			
2"	3"	3"L	4"	6"
B105-Z-02-Y-NP	B105-Z-03-Y-NP	B105-Z-03L-Y-NP	B105-Z-04-Y-FF	B105-Z-06-Y-FF

Manual control, hydraulic actuation with 3-way selector
Application: Manual command for master valve and zone control.

110 SERIES Electric control, manual override on solenoid

Threaded-NPT (NP)	Flanged (NP)			
2"	3"	3"L	4"	6"
B110-3W-02-Y-NP	B110-3W-03-Y-NP	B110-3W-03L-Y-NP	B110-3W-04-Y-FF	B110-3W-06-Y-FF

Standard solenoid: S-400-3W 24VAC-R
Application: Electrically controlled valve for computerized irrigation systems and conventional timer controlled systems. The 110 series electric valves are ideal for master valve and zone control applications.

120 SERIES Pressure reducing, manual control with 3-way selector

Threaded-NPT (NP)	Flanged (NP)			
2"	3"	3"L	4"	6"
B120-XZ-02-Y-NP	B120-XZ-03-Y-NP	B120-XZ-03L-Y-NP	B120-XZ-04-Y-FF	B120-XZ-06-Y-FF

Standard pilot: model PC-X-P plastic mini pilot for 7-40 psi downstream pressure.*
Manual selector standard
Application: The 120 series valves protect downstream components from erratic and high pressures. Adjustable reducing valves optimize performance, of pressure sensitive emission devices by providing constant operating pressure

12055 SERIES Pressure reducing, electric control

Threaded-NPT (NP)	Flanged (NP)			
2"	3"	3"L	4"	6"
B12055-X-02-Y-NP	B12055-X-03-Y-NP	B12055-X-03L-Y-NP	B12055-X-04-Y-FF	B12055-X-06-Y-FF

Standard pilot: model PC-X-P plastic mini pilot for 7-40 psi downstream pressure.*
Standard solenoid: S-400-3W 24VAC-R
Application: Pressure reducing, electric valves combine the features of electric control and adjustable pressure reduction. The 12055 establishes a reduced pressure zone to optimize emission device performance.

130 SERIES Pressure sustaining, manual control with 3-way selector

Threaded-NPT (NP)	Flanged (NP)			
2"	3"	3"L	4"	6"
B130-XZ-02-Y-NP	B130-XZ-03-Y-NP	B130-XZ-03L-Y-NP	B130-XZ-04-Y-FF	B130-XZ-06-Y-FF

Standard pilot: model PC-X-P plastic mini pilot for 7-40 psi upstream pressure.*
Manual selector standard
Application: Sustaining valves are used to relieve excess line pressures and to rotect systems with erratic supply pressures. Sustaining valves, maintains preset minimum upstream pressure during fluctuating flows or varying pressure conditions. Normally open pressure sustaining valves are used to maintain adequate upstream pressures during filter back flushing and line filling.

FLOW RATE

Valve Size	Flow Rate GPM	
	From	To
2"	35	140
3"	35	300
3L"	75	580
4"	75	580
6"	140	1000

PILOT SPRING OPTIONS

For Plastic Valves with model PC-X-P plastic mini pilots (*)

	Spring Code	Operating Range
To add a pre-installed optional pilot spring to plastic valves. Add the correct spring code to the end of the valve part number.	-K	7-40 psi standard
	-H	15-100 psi

Optional Pilot springs may be required for different pressure ranges. Choose an optional pilot spring then valves operate outside the range of the standard spring.

ELECTRICAL SPECIFICATION

3-way solenoid with plastic base for 110 or 12055 valves

Part Number	Voltage	Normally Open/Close	Inrush (Amp)	Holding (Amp)	Power (Watt)
S400-3W-24VAC-R (standard)	24VAC	NO	0.60	0.30	3.5
S400-3W12VAC-R	12VAC	NO	0.33	0.33	4.0
S400-3W-24VAC-R (standard)	24VAC	NO	0.60	0.30	3.5

Metal Control Valves

Standard Configuration:

- Cast Iron Globe configuration (G)
- Pressure Rating: Minimum operating 10 psi, Maximum inlet 230 psi
- Connections: Threaded 1 ½" thru 3" NPT (NP) - Iron flanged 4" thru 10" (A1)
- 3" thru 4" valves are constructed using plastic tubing, fittings and plastic mini pilots
- 6" thru 10" valves and 1 1/2" thru 3" Quick Relief valves are constructed using copper tubing and brass pilots
- Pressure check points and outlet isolation ball valves are furnished on metal pressure reducing valves
- Manual, electric and hydraulic valves are normally closed (NC)

FLOW RATE

Valve Size	Flow Rate GPM	
	From	To
3"	60	400
4"	90	700
6"	180	1400
8"	310	2200
10"	340	2400

PILOT SPRING OPTIONS

For Plastic Valves with model PC-X-P plastic mini pilots (*)

	Spring Code	Operating Range
To add a pre-installed optional pilot spring to plastic valves. Add the correct spring code to the end of the valve part number.	-K	7-40 psi standard
	-H	15-100 psi

Optional Pilot springs may be required for different pressure ranges. Choose an optional pilot spring then valves operate outside the range of the standard spring.

ELECTRICAL SPECIFICATION

3-way solenoid with plastic base for 3" - 4" 410, 42055 valves

Part Number	Voltage	Normally Open/Close	Inrush (Amp)	Holding (Amp)	Power (Watt)
S400-3W-24VAC-R (standard)	24VAC	NO	0.60	0.30	3.5
S400-3W12VAC-R	12VAC	NO	0.33	0.33	4.0
S400-3W-24VAC-R (standard)	24VAC	NO	0.60	0.30	3.5

Solenoid Note: Normally Open (NO) solenoids are used to construct normally closed valves. Normally Closed solenoids are used to construct normally open valves. Manually actuated valves may be converted to normally open or normally closed by arrangement of the hydraulic control connections.

405 SERIES Manual control, hydraulic actuation with3-way selector

Threaded-NPT (NP)	Flanged (NP)			
3"	4"	6"	8"	10"
B405-Z-03-G-NP	B405-Z-04-G-A1	B405-Z-06-G-A1	B405-Z-08-G-A1	B405-Z-10-G-A1

Manual control, hydraulic actuation with 3-way selector
Application: Manual command for master valve and zone control.

410 SERIES Electric control, manual override on solenoid

Threaded-NPT (NP)	Flanged (NP)			
3"	4"	6"	8"	10"
B410-X-03-G-NP	B410-X-04-G-A1	B410-X-06-G-A1	B410-X-08-G-A1	B410-X-10-G-A1

Standard solenoid: 3" thru 4" metal valves S-400-3W-24VAC-R: 6" thru 10" metal valves ASC-3W24VAC-NO
Application: Electrically controlled valve for computerized irrigation systems and conventional timer controlled systems. The 410 series electric valves are ideal for master valve and zone control.

420 SERIES Pressure reducing, manual control with 3-way selector
Reduces upstream pressure tolower constant downstream pressure.
Manual ON/OFF with 3 way selector

Threaded-NPT (NP)	Flanged (NP)			
3"	4"	6"	8"	10"
B420-XZ-03-G-NP	B420-XZ-04-G-A1	B420-XZ-06-G-A1	B420-XZ-08-G-A1	B420-XZ-10-G-A1

Standard pilot: 3" thru 4" metal valves- model PC-X-P plastic mini pilot for 7-40 psi downstream pressure.(*)
Standart pilot: 6" thru 10" metal valve- model X brass pilot for 7-150 psi downstream pressure. (#)
Application: The 420 series pressure reducing valves protect downstream components from erratic andhigh pressure. Adjustable pressure reducing valves optimize performance of pressure sensitive emission devices by providing constant operation pressure.

42055 SERIES Electric control, manual override on solenoid

Threaded-NPT (NP)	Flanged (NP)			
3"	4"	6'	8"	10"
B42055-X-03-G-NP	BB42055-X-04-G-A1	BB42055-X-06-G-A1	BB42055-X-08-G-A1	BB42055-X-10-G-A1

Standard solenoids: 3" thru 4" metal valves S-400-3W-24VAC-R : 6" thru 10" metal valves ASC-3W24VAC-NO
Standard pilot: 3" thru 4" metal valves model- PC-X-P plastic mini pilot for 7-40 psi downstream pressure.(*)
Standard pilot: 6" thru 10" metal valves- model- X brass pilot for 7-150 psi downstream pressure.(#)
Application: Pressure reducing, electric 42055 metal valves combine the features of electric control and adjustable pressure reduction. The 42055 establishes a continuous, reduced pressure zone to optimize emission device performance.

43Q SERIES Quick Pressure Relief, relieves excessive line pressure by immediately opening when preset line pressure is met.

Threaded-NPT (NP)	Flanged (NP)	
1½"	2"	3"
B43Q-015-G-NP	B43Q-02-G-NP	B43Q-03-G-NP

Application: The 43Q adjustable quick pressure relief valves provide systems with protection from excessive pressure.
Quick relief valves are located at the irrigation headwords or other positions where water hammer may occur due to rapid valve closure, power failure or erratic pressure situations. 43Q valves eliminate momentary peak pressure spikes and are often used to protect sand media filters. Globe (G) is the standard configuration for 43Q valves. The Angle (A) configuration is also available.

3-Way Solenoid with metal base for 6" thru 10" 410 and 42055 metal valve

Part Number	Voltable	Normally Open/Close	Inrush (Amp)	Holding (Amp)	Power
ASC-3W24VAC-NO (standard)	24VAC	NO	1.25	0.66	6.1
ASC-3W12VDC-NO	12VDC	NO	–	–	10.6
ASC-3W24VAC-NC	24VAC	NC	1.25	0.66	6.1

Add optional solenoid part number to theend of valve part number to receive pre-installed non standard solenoids. Other solenoid options available upon request.

Air/Vacuum Valves

Air and vacuum control is essential to the safety, longevity, efficiency, and performance of an irrigation system. Air must be allowed to exit pipelines 1) upon startup to prevent water hammer, 2) during normal operation to prevent the development of air pockets, and 3) air must be allowed to enter pipelines and laterals at shut down to prevent vacuum suction. Various types of valves and vents are available to perform these functions.

APPLICATION

Removal of Air from Pipelines

- Avoid Water Hammer:
  Air must be allowed to escape pipelines at the same rate as water enters the pipeline during system startup to avoid dangerous water hammer from occurring.
- Remove Entrained or Dissolved Air:
  Air that has accumulated at high points during system operation must be allowed to escape to avoid air pockets which restrict the flow of water and can cause water hammer.

Allow the Entry of Air into Pipelines

- Prevent Vacuum Suction in Pipelines:
  Air must be allowed to re-enter main and submain pipelines as water drains during system shut down to prevent negative suction from occurring and potential collapse of the pipelines.
- Prevent Vacuum Suction in Laterals:
  Laterals which are buried or submerged in water may ingest dirty water and/or soil through the emitters as a result of vacuum suction if air is not allowed to enter the laterals during system shut-down and drainage.

½" Vacumm Breaker

1" Plastic Air Vent

1" & 2" Continuous Acting Air Release Valves

1" & 2" Air Release & Vacumm Relief Valves

2", 3" & 4" Aluminum Air Vents

Air/Vacuum Valves

CONTINUOUS ACTING AIR RELEASE VALVES

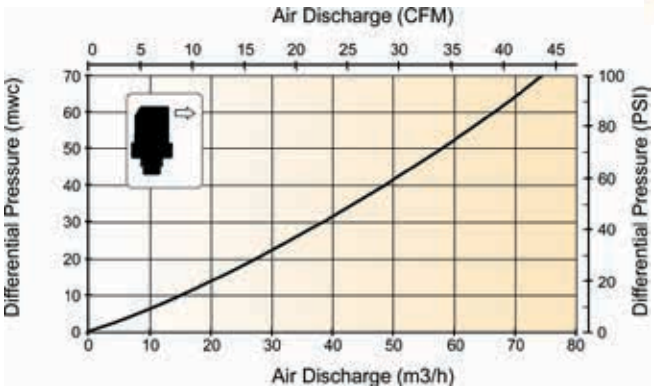
1" & 2" Combination Large Volume Air Relief and Continuous Acting Air Release & Vacuum Relief Valve

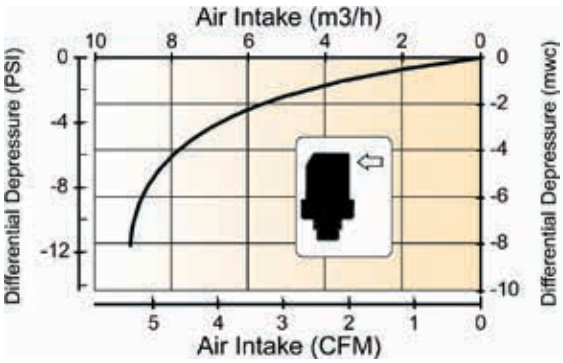
- Install at highest points on filter and pump stations to provide both instantaneous and continuous air relief
- Install on main manifolds every 1000 feet to introduce air into the irrigation system at shutdown to prevent pipe collapse
- Install at highest point of slope to provide vacuum relief at system shutdown

SPECIFICATIONS

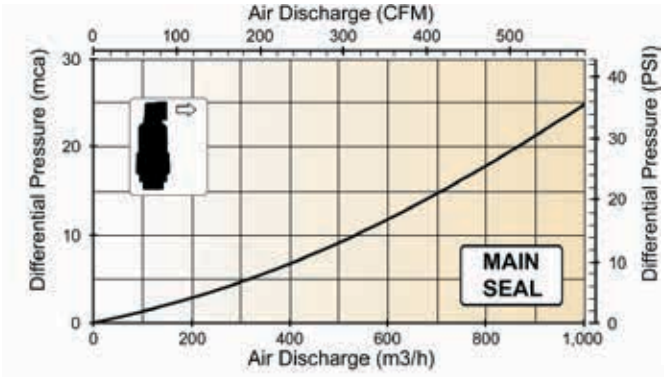
Part Number	ARV-1-A	ARV-2-KA
Valve Type	Single Acting Continuous	Dual Acting Continuous
Connection - male NPT (in)	1	2
Working Pressure (psi)	170	225
Sealing Pressure (psi)	3	3
Volume of air release without valve closing and without the presence of water (CFM)	41.2	590
Release Air Volume @ 5 psi	8.8 CFM	140 CFM
Units per Box	20	8
Box Weight (lbs)	15	16
Packing Dimensions (in)	15" x 11" x 8"	

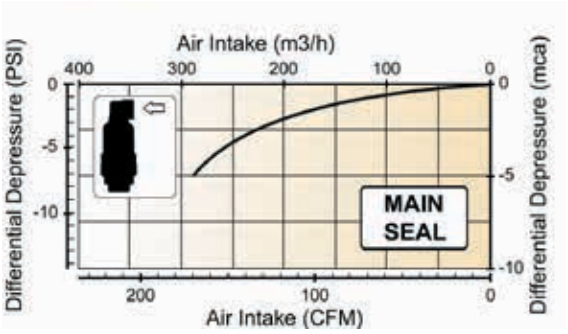
ARV-1-A

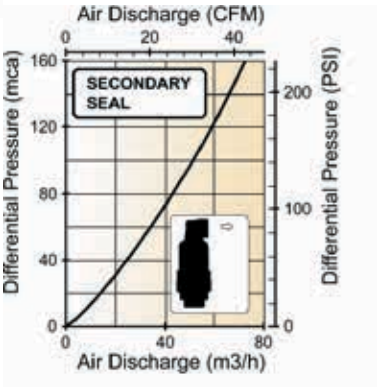




ARV-2-KA







Unit Glossary

CFM	Cubit feet per minute
PSI	Pounds per square inch
M3/h	Cubic meters per hour
in	inch
mwc	meters of water column

1 cubic foot of water = 7.48 gallons
1 CFM = 1.699 m³/h
1 PSI = 0.070307 mwc

Air/Vacuum Valves

AIR RELEASE AND VACUUM RELIEF VALVES

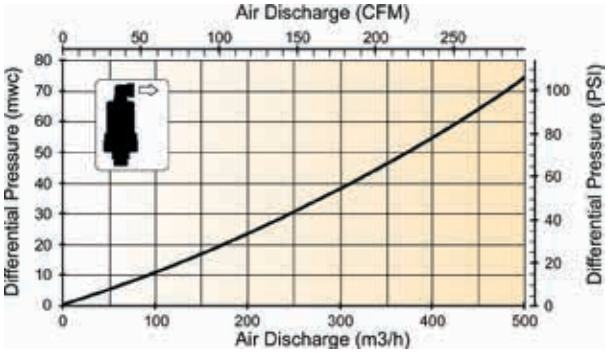
1" & 2" Air Release & Vacuum Relief Valves

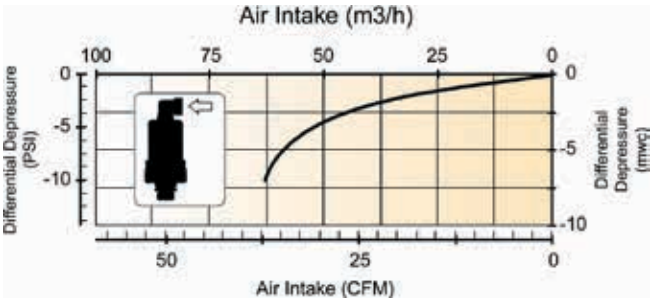
- Install on manifolds to exhaust air at system start-up
- Install on manifolds to introduce air into the pipeline and provide vacuum relief after system shutdown
- Install downstream of valves to introduce air into the pipeline and provide vacuum relief after valve shutdown
- Install at highest point of slope to introduce air into the pipeline and provide vacuum relief after valve shutdown

SPECIFICATIONS

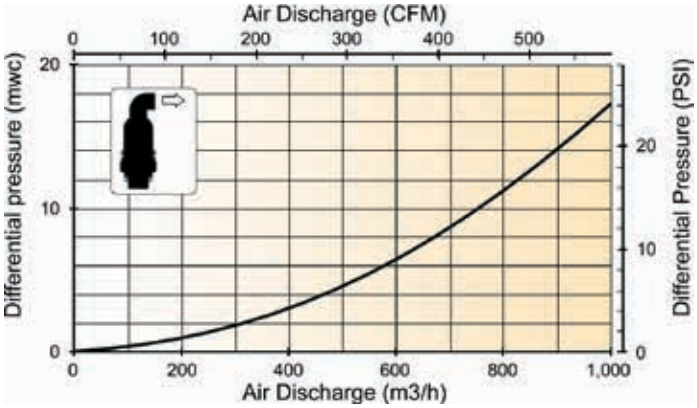
Part Number	ARV-1-K	ARV-2-K
Valve Type	Air / Vacuum Relief	
Non-Continuous		
Connection - male NPT (in)	1	2
Working Pressure (psi)	225	225
Sealing Pressure (psi)	3	3
Volume of air release without valve closing and without the presence of water (CFM)	295	590
Release Air Volume @ 5 psi	26 CFM	260 CFM
Units Per Box	14	8
Box Weight (lbs)	12	14
Packing Dimensions (in)	15" x 11" x 8"	

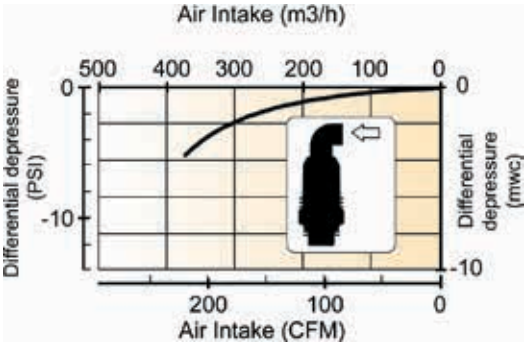
ARV-1-K





ARV-2-K





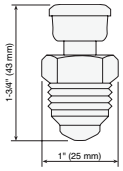
Air/Vacuum Valves

YD-500-34

1/2" VACUUM BREAKER

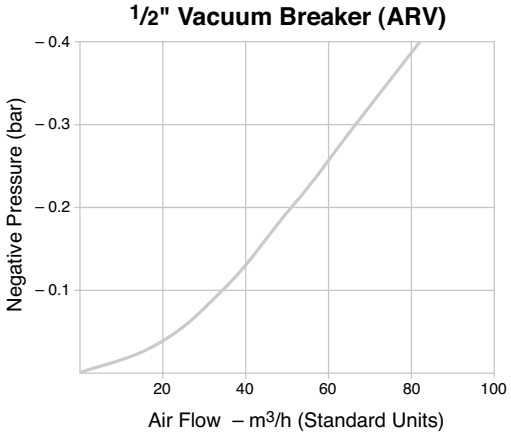
The 1/2" Air & Vacuum Relief Valve (ARV) is specifically designed to prevent soil ingestion of emitters from back siphoning.

- Large Air Passage
- High resistance to chemicals
- Smooth, reliable operation
- Easy to handle and maintain
- Plastic construction
- Buna-N Seal system shutdown



SPECIFICATIONS

Part Number	YD-500-34
Valve Type	1/2" Vacuum Breaker
Connection - male NPT (in)	0.5
Working Pressure (psi)	Max. 150
Temperature (°F)	Max. 180
Units per Bag	10
Weight (lbs ; grams)	0.024 ; 11



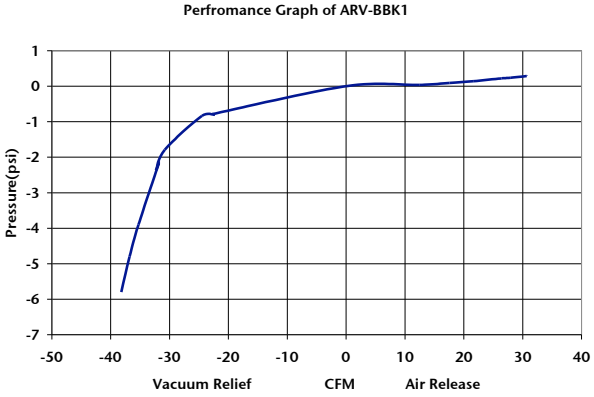
ARV-BBK1

1" PLASTIC AIR VENT

The 1" Plastic Air Vent provides instant air and vacuum relief. The brightly colored cap allows for easy visibility and is removable for easy maintenance.

SPECIFICATIONS

Part Number	ARV-BBK1
Valve Type	Plastic Air Vent
Connection - male NPY (in)	1
Sealing Pressure (psi)	80
Totally sealed from (psi)	5
Unit per box	25
Box weight (lbs)	5



*Performance Data Tested and Verified at CIT, Fresno, California.
**Conversion: 1 cubic foot of water = 7.48 gallons

Air/Vacuum Valves

ARV-2AV

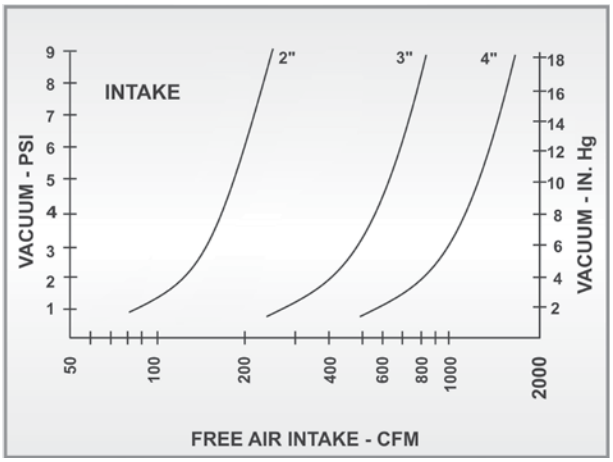
SPECIFICATIONS

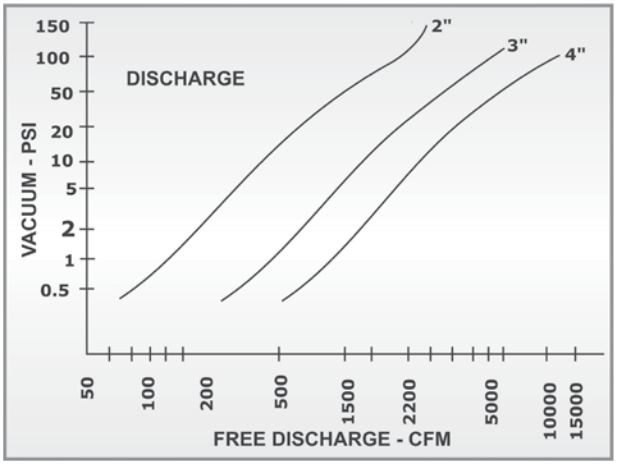
Part Number	ARV-2AV	ARV-3AV	ARV-4AV
Valve Type	Aluminum Air Vent	Aluminum Air Vent	Aluminum Air Vent
Connection - female NPT (in)	2	3	4
Working Pressure (psi)	Max. 150	Max. 100	Max. 100
Units per Box	25	10	4

ALUMINUM AIR VENTS

The Aluminum Air Vent series can be used on gravity or higher pressure systems, allowing for operation up to 150 psi on the 2" model and 100 psi on 3" and 4" models. The float and precision O-Ring provide a tight seal at a very low pressure, while the strong aluminum alloy body and full baffle allow for maximum vent capacity without premature closing.

- Cast Aluminum body combines lightweight strength and corrosion resistance
- Synthetic rubber O-ring assures a positive seal even with low head applications
- Simple design ensures troublefree performance
- Available in 2", 3", & 4" Female NPT inlet





*Conversion: 1 cubic foot of water = 7.48 gallons

Sentinel™ Valves

This durable, heavy-duty angle valve offers proven reliability under the most demanding conditions. The valve offers a host of features that deliver strong and reliable performance that make this valve ideal for agricultural, commercial and industrial applications.

FRICTION LOSS DATA

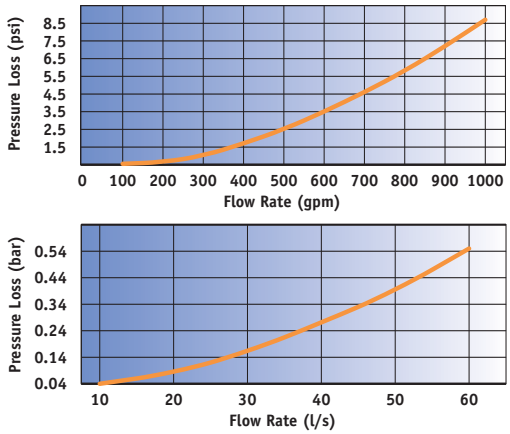
Friction Loss Table in PSI (valve wide open)

Flow Rate (gpm)	100	200	300	400	500	600	700	800	900	1000
Head Loss (psi)	0.055	0.64	1.00	1.79	2.50	3.50	4.60	5.80	7.20	8.70

Friction Loss Table in Bar (valve wide open)

Flow Rate (Liters/sec)	10	20	30	40	50	60
Flow Rate (M3/hr.)	36	72	108	144	180	216
Head Loss (Bar)	0,04	0,08	0,16	0,27	0,39	0,55

FLOW RATE VS. PRESSURE LOSS



FEATURES & BENEFITS

- Low maintenance, low cost, angle pattern valve
- Constructed of rugged, lightweight, corrosion proof materials with excellent chemical and weather resistance
- Available in manual, electric with manual override, or hydraulic configurations
- Ideal for industrial and irrigation applications
- Manual and electric valves have internal manual bleed
- Pressure regulating models include 0–100 psi or 0–30 psi (0–6,9 or 0–2 bar) regulator with schrader valve (less gauge) to check pressure setting
- Inlet pressure for pressure regulating models must be 15 psi (1,03 bar) greater than desired outlet pressure
- Designed for slow opening and closing time to prevent surge and waterhammer
- Easily serviced without removal from an installed system

SPECIFICATIONS

- Size: 4 inch (120 mm)
- Connections: Grooved (Victaulic type)
- Materials:
  - PVC Plastic (Body Construction)
  - Stainless Steel (Internal Trim)
  - Brass (External Trim)
- Maximum Operating Temperature: 140° F (60° C)
- Flow Rate: 100–1000 gpm (0–60 l/s)
- Pressure Rating: 150 psi (10,3 bar)
- Cv Factor: 300
- Operating Pressure Range: 15–150 psi (1,03–10,3 bar)
- Solenoid: 24 vac, 0.48 amp inrush, 0.24 amp holding
- Closure Time: 90 seconds (approx.) from wide open position
- Dimensions: 8" x 10" x 12" (203 mm x 254 mm x 305 mm)
- Weight: 7.3 lbs. (3,3 kilos)

MODELS

Hydraulic	VPR20000
Manual	VPR30100
Electric	VPR10107

Pressure Regulating:

Manual	VPR31100-100*
Electric	VPR11107-100*

* For 30 psi (2 bar) substitute "-30" for "-100", i.e.: VPR31100-30.

ACCESSORIES

Victaulic Coupling:

- ZCP9531-04 — 4" coupling to be used with 4" Sentinel valve (use 2 per valve installation), back wash valve, and Sand media filters.
- IKA01100 — 4" groove x male Spigot, Schd. 80 to be used with 4" Sentinel valve. (use 2 per valve installation)

100 Series Plus Valves

The Irritrol® 100 Series (Century PLUS) is an excellent example of a good valve getting better. Offered in a globe/angle configuration with sizes ranging from one to three inches, the 100 Series features a pressure range of 10-220 psi, optional modular pressure regulation, stainless steel metering, internal and external bleed, a nylon-reinforced Buna-N double-beaded diaphragm and an anti-contamination design for dirty water applications (available on all 102 Models).

FRICTION LOSS DATA – PSI

Flow Rate - GPM

MODEL	SIZE	GLOBE ANGLE	5	10	20	30	40	50
A-100P1	1″	G	6.30	4.20	3.20	4.10	7.20	10.90
A-102P1		A	6.30	4.20	3.10	2.70	4.80	7.90

Flow Rate - GPM

MODEL	SIZE	GLOBE ANGLE	30	40	50	60	70	80	90	100	110
A-100P1.5	1 1/2″	G	1.60	2.30	3.60	5.20	7.00	9.20	11.70	14.40	17.50
A-102P1.5		A	1.30	1.60	2.80	4.00	5.50	7.10	9.00	11.00	13.30

Flow Rate - GPM

MODEL	SIZE	GLOBE ANGLE	80	90	100	110	120	130	140	150	175
A-100P2	2″	G	2.10	2.70	3.30	4.00	4.80	5.60	6.50	7.50	8.60
A-102P2		A	1.20	1.60	2.00	2.40	2.80	3.30	3.90	4.40	5.00

Flow Rate - GPM

MODEL	SIZE	GLOBE ANGLE	150	175	200	225	250	275	300
A-100P3/ A-102P3	3″	G	2.50	3.00	4.10	5.30	6.70	8.30	10.10
		A	1.90	2.40	3.30	4.30	5.50	6.90	8.50

Notes: Pressure loss data are derived from valves independently tested by CIT, Fresno, CA.

FEATURES & BENEFITS

Tough, glass-reinforced nylon, stainless steel and brass construction
Withstands high temperatures and system surges under pressure for long-term reliability

220 psi pressure rating
Prevents water hammer and system damage in high-pressure installations

Internal and external bleed (flush mode)
Manual operation

Externally removable self-cleaning metering system
Provides consistent performance in recycled-water applications

Accepts OmniReg® modular pressure regulator
Ensures consistent performance

102 Anti-Contamination Models

150-mesh external control water filter and three-way solenoid
Provides non-continuous metering for recycled water applications

Selectable normally open or normally closed mode (factory set at normally closed)
Provides flexibility

Control water filter
Allows easy external service

OPERATING SPECIFICATIONS

- Flow range: 5-300 GPM
- Pressure range: 10-220 psi; 10-100 psi (102 models)

ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp (102 models: .48 amp)
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp (102 models: .24 amp)

Note: DC latching solenoid is not compatible with 102 anti-contamination models

MODELS

Model	Description
A-100P1	1″ internal bleed, flow control
A-100P1.5	1½″ internal bleed, flow control
A-100P2	2″ internal bleed, flow control
A-100P3	3″ internal bleed, flow control
A-102P1	1″ anti-contamination filter
A-102P1.5	1½″ anti-contamination filter
A-102P2	2″ anti-contamination filter
A-102P3	3″ anti-contamination filter

OPTIONAL ACCESSORIES

- DC latching solenoid (A-DCL)
  Note: Maximum pressure for a valve that utilizes latching solenoid is 120 psi.
- Weatherproof gauge (SPK-100)

PRESSURE REGULATION

213 MODELS

- Manual downstream pressure regulating valves
- Available in downstream sensing in 20–100 or 0–30 psi (1,4–6,9 or 0–2 bar) range
- Self-modulating pressure regulator maintains constant downstream pressure within +/- 2 psi (0,14 bar) of pressure setting [for in-valve sensing; within +/- 1 psi (0,07 bar) for downstream sensing]
- All flow ranges must be within recommended range indicated on pressure loss chart — minimum 15 gpm (0,9 l/s) recommended for 103 and 213 models
- Inlet pressure must be 15 psi (1,03 bar) greater than desired outlet pressure

ELECTRICAL SPECIFICATIONS

- Solenoid: 24 VAC
- Inrush volt-amp: 24 VAC-11.50 VA
- Inrush current: .4 amp (102 models: .48 amp)
- Holding volt-amp: 24 VAC-5.75 VA
- Holding current: .2 amp (102 models: .24 amp)

OPTIONAL ACCESSORIES

- Hydraulic conversion kit (HVC-Kit)
- Reclaimed water kit (RW60-Kit)
- DC latching solenoid (A-DCL)

Example:

How To Order:

A-100P 1 -LS

Model	Size	Solenoid
A-100P1	1"	yes
A-100P1.5	1.5"	yes
A-100P2	2"	yes
A-100P3	3"	yes
A-100P1-LS	1"	no
A-100P1.5LS	1.5"	no
A-100P2-LS	2"	no
A-100P3-LS	3"	no

A-102P 1 DS

Model	Size	Solenoid
A-102P1	1"	yes
A-102P1.5	1.5"	yes
A-102P2	2"	yes
A-102P3	3"	yes

Pressure Regulating

Downstream Sensing 0–100psi		
213P1-100DS	1"	no
213P1.5-100DS	1.5"	no
213P2-100DS	2"	no
Downstream Sensing 0–30psi		
213P1-30DS	1"	no
213P1.5-30DS	1.5"	no
213P2-30DS	2"	no

Flow Rate (GPM)

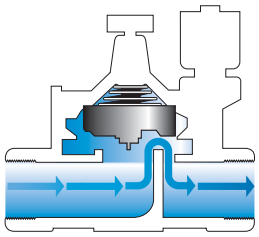
Model	Style	Size	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	175	200	225	250	275	300
A-100P1/A-102P1 213P1-100DS 213P1-30DS	Globe	1"	4.2	3.2	4.1	7.2	10.9																
	Angle		4.2	3.1	2.7	4.8	7.9																
A-100P1.5/A-102P1.5 213P1.5-100DS 213P1.5-30DS	Globe	1 ½"			1.6	2.3	3.6	5.2	7.0	9.2	11.7	14.4	17.5										
	Angle				1.3	1.6	2.8	4.0	5.5	7.1	9.0	11.0	13.3										
A-100P2/A-102P2 213P2-100DS 213P2-30DS	Globe	2"								2.1	2.7	3.3	4.0	4.8	5.6	6.5	7.5						
	Angle									1.2	1.6	2.0	2.4	2.8	3.3	3.9	4.4						
A-100P3/A-102P3 213P3-100DS 213P3-30DS	Globe	3"															2.5	3.0	4.1	5.3	6.7	8.3	10.1
	Angle																1.9	2.4	3.3	4.3	5.5	6.9	8.5

Pressure Loss PSI

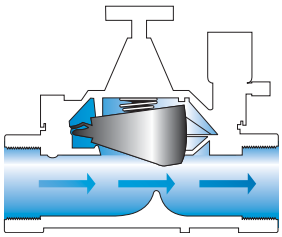
NOTES: (1) When designing a system, the industry standard for flow rate velocity through pipes and fittings is 5 Fps (2m/s).
(2) Pressure loss data is derived from valves independently tested by C.I.T., Fresno, CA.
(3) Hydraulic actuated valves vented to atmosphere will show lower pressure loss figures at low flows (HVC-Kit).
(4) Pressure regulating valves must operate in the recommended flow ranges – For the best pressure regulation the valves should be sized at the upper end of the flow range. ex: for 100 gpm the 1½" valve should be specified instead of the 2" valve.

700 Series Valves

Unique straight-through flow path provides low-pressure loss and superior regulating capabilities. The 700 Series Ultra-Flow valves are ideal for low flow applications found in nursery and greenhouses.



Conventional flow path



The UltraFlow Series straight-through flow path

FRICTION LOSS DATA - PSI

Flow Rate - GPM

MODEL	SIZE	0.1	2	5	10	15	20	30	40	50
A-700B-.75	¾"	0.38	0.38	0.86	1.22	2.03	3.27	6.75		
A-700-1	1"	2.20	1.59	1.80	2.41	2.23	1.84	3.22	5.58	8.59

Flow Rate - GPM

MODEL	SIZE	15	20	30	40	50	60	80	100	120	140	160	180
A-700-1.5	1 ½"	0.19	0.36	0.69	1.13	1.49	2.13	3.85	6.06	8.72	11.89		
A-700-2	2"			0.64	0.83	0.98	1.17	2.07	3.06	3.96	5.21	6.50	8.23

FEATURES & BENEFITS

Unique straight-through flow path
Provides extremely low friction loss

Slow-closing design
Reduces water hammer and resulting stress on the system

Tough glass-reinforced nylon, stainless steel and brass construction
Provides durability and long life

High and low-flow operation
Ensures consistent performance in a variety of applications

Self-flushing, 150-mesh, stainless steel filter screen on 1-, 1 ½- and 2-inch models
Provides consistent operation

ADDED FEATURES

- Manual internal bleed
- Wide flow range
- Flow control allows precise flow adjustment and manual shutoff (not available on ¾-inch model)
- Compact, low-profile design
- Rugged nylon-reinforced Buna-N diaphragm provides leak-proof seal
- Buna-N valve seat seal
- Encapsulated injection-molded solenoid with a captive hex plunger
- Unique three-way stainless steel bonnet screws with threaded brass inserts accept Phillips, flat-blade and hex-driver tools

OPERATING SPECIFICATIONS

- Flow range: .1-180 GPM (700B-.75 & 700-1 can operate at .1 GPM)
- Pressure range: 10-150 psi
  (A-700-2 not recommended under 20 psi)

ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp

MODELS

Model	Description
A-700B-.75	¾" internal bleed flow control
A-700-1	1" internal bleed flow control
A-700-1.5	1½" internal bleed flow control
A-700-2	2" internal bleed flow control

PRESSURE REGULATION

713 MODELS

- Manual downstream pressure regulating valves
- Available in 1", 1.5" and 2" models (25, 40 and 50 mm)
- Available in in-line and downstream sensing versions, with 20–100 or 0–30 psi (1,4–6,9 or 0–2 bar) range
- Self-modulating pressure regulator maintains constant downstream pressure within +/- 2 psi (0,14 bar) of pressure setting [for in-valve sensing; within +/- 1 psi (0,07 bar) for downstream sensing]
- All flow ranges must be within recommended range indicated on pressure loss chart — minimum 15 gpm (0,9 l/s) recommended for 703 and 713 models
- Inlet pressure must be 15 psi (1,03 bar) greater than desired outlet pressure

ELECTRICAL SPECIFICATIONS

- Solenoid: 24 VAC
- Inrush volt-amp: 24 VAC-11.50 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 VAC-5.75 VA
- Holding current: .2 amp

OPTIONAL ACCESSORIES

- Hydraulic conversion kit (HVC-Kit)
- Reclaimed water kit (RW60-Kit)
- DC latching solenoid (A-DCL)

Example:

How To Order:

A-700B .75 -LS

Model	Size	Solenoid
A-700B-.75	3/4"	yes
A-700-1	1"	yes
A-700B-1.5	1.5"	yes
A-700-2	2"	yes
A-700B-.75-LS	3/4"	no
A-700-1-LS	1"	no
A-700-1.5-LS	1.5"	no
A-700-2-LS	2"	no

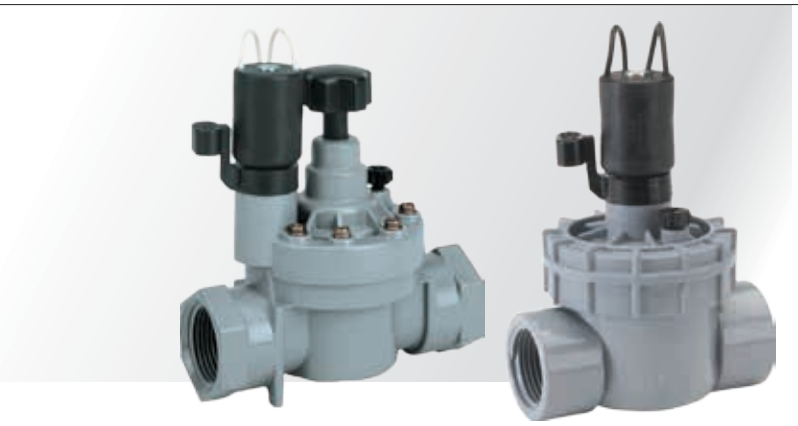
Pressure Regulating

Downstream Sensing 0–100psi		
713-1-100DS	1"	no
713-1.5-100DS	1.5"	no
713-2-100DS	2"	no
Downstream Sensing 0–30psi		
713-1-30DS	1"	no
713-1.5-30DS	1.5"	no
713-2-30DS	2"	no

Flow Rate (GPM)																	
Model	Size	2	5	10	15	20	30	40	50	60	80	100	120	140	160	180	Pressure Loss PSI
A-700B-.75	3/4"	0.38	0.86	1.22	2.03	3.27	6.75										
A-700-1 713-1-100DS 713-1-30DS	1"	1.59	1.80	1.84	2.23	2.41	3.22	5.58	8.59								
A-700-1.5 713-1.5-100DS 713-1.5-30DS	1 1/2"				0.19	0.36	0.69	1.13	1.49	2.13	3.85	6.06	8.72	11.89			
A-700-2 713-2-100DS 713-2-30DS	2"						0.64	0.83	0.98	1.17	2.07	3.06	3.96	5.21	6.50	8.23	

NOTES: (1) When designing a system, the industry standard for flow rate velocity through pipes and fittings is 5 Fps (2m/s). (2) Pressure loss data is derived from valves independently tested by C.I.T., Fresno, CA.

1” PVC Valves



These versatile 1” valves include key standard features such as flow control, manual internal and external bleed that are popular with agriculture and greenhouse growers. The valves’ wide flow ranges makes them a good fit for a host of applications. These economical valves have a good reputation and a five year warranty making them an easy choice for growers.

FRICTION LOSS DATA – PSI

Flow Rate - GPM

MODEL	SIZE	.25	2	5	10	15	20	30
A-2500TF	1”	5.40	3.82	3.00	2.20	1.90	3.10	5.10

Flow Rate - GPM

MODEL	SIZE	.25	2	5	10	15	20	30
A-2400TF	1”	5.00	4.60	3.50	4.00	2.97	3.26	6.20

FEATURES & BENEFITS

2500TF Features

- Self aligning bonnet permits fast and easy servicing without removal from the system
- Debris-tolerant, patented floating metering system suitable for well water and dirty water applications
- Captured hex/Phillips screws
- Flow control allows precise flow adjustment and manual shutoff
- Removable, tamper resistant flow control handle

2400TF Features

- Threaded bonnet design allows easy servicing without removal from the system
- Flow control allows precise flow adjustment and manual shutoff

Features

- Manual internal bleed
- Manual external bleed
- Slow-closing design reduces water hammer
- Flow control allows precise flow adjustmentand manual shut off

QUALITY CONSTRUCTION

- Rugged, double–beaded SANOPRENE™ diaphragm provides leak-proof seal
- Heavy-duty, corrosion and UV-resistant PVC construction with stainless steel spring and hardware
- Buna-N valve seat seal
- High strength ribbed bonnet
- Injection molded solenoid with a captive plunger

OPERATING SPECIFICATIONS

- Flow range: 0.25-30 GPM (1-155 L/M)
- Pressure Range: 10-150 PSI (0.7-10 Bars)

ELECTRICAL SPECIFICATIONS

- Solenoid: 24 VAC
- Inrush volt-amp: 24 VAC-11.50 VA
- Holding volt-amp: 24 VAC-5.75 VA
- Holding current: 0.2 amps
- Inrush current: 0.4 amps
- DC Latching solenoid (A-DCL) optional

1½" & 2" PVC Valves

Irritrol®

The 1½" A-216B and 2" A-217B PVC valves have built their popularity on a proven track record of reliability in agriculture and greenhouse applications. Their key features include flow control, manual bleed, and porting for use in globe and angle configurations. These versatile valves are ideal for a wide range of agricultural applications.

FEATURES & BENEFITS

- Manual internal bleed
- Manual external bleed
- Slow-closing design reduces water hammer
- Flow control allows precise flow adjustment and manual shut off

QUALITY CONSTRUCTION

- Heavy-duty, corrosion and UV-resistant PVC construction with stainless steel spring and hardware
- Rugged, double–beaded SANOPRENE™ diaphragm provides leak-proof seal
- Buna-N valve seat seal
- High strength ribbed bonnet and bottom inlet
- Unique, O-ring seal on the threaded inlet plug prevents leaking
- Injection molded solenoid with captive plunger
- Easily serviced without removal from the system
- Unique three-way stainless steel bonnet screws accept Phillips, flat-blade and hex-drive tools

OPERATING SPECIFICATIONS

- Flow range: 20-120 GPM
- Pressure range: 20-150 PSI

ELECTRICAL SPECIFICATIONS

- Solenoid: 24 VAC
- Inrush volt-amp: 24 VAC-11.50 VA
- Holding volt-amp: 24 VAC-5.75 VA
- Holding current: 0.2 amps
- Inrush current: 0.4 amps
- DC Latching solenoid (A-DCL) optional

FRICTION LOSS DATA – PSI

MODEL	SIZE	GLOBE ANGLE	5	10	15	20	30	40	50	60	80	100	120
A-216B	1½"	G				3.04	2.66	2.33	2.97	4.14	5.62		
		A				2.76	2.24	1.99	2.30	3.10	4.42		
A-217B	2"	G				2.00	1.93	1.73	1.55	1.68	2.99	4.85	6.31
		A				2.00	1.93	1.73	1.55	1.59	2.15	3.27	4.88

OmniReg®

Modular Pressure Regulator

OMR-100

This pressure-regulating device enables the user to quickly and accurately set the exact downstream pressure required for any application.

FEATURES & BENEFITS

Maintains constant downstream pressure, regardless of widely varying inlet pressure
For consistent operation of downstream emission devices

One model fits all heavy-duty commercial 100 Series (Century PLUS), 700 Series (UltraFlow), and 200B Series valves*
Streamlines inventory requirements

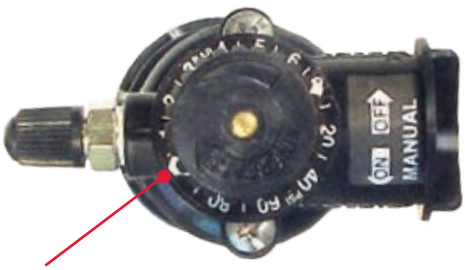
Requires only 1 GPM to operate
Ideal for low-flow applications

"Drop in" installation is fast and easy, requiring tightening of only two capture screws
For reduced labor time

ADDED FEATURES

- Clearly marked dial settings permit precise control of downstream pressure
- Desired pressure may be set with water on or off
- Delivers an accuracy of ±3 psi
- Low-profile design permits use in applications with limited space
- Schrader valve test port is easily accessible for in-line use
- Manufactured of heavy-duty, corrosion-resistant glass-filled nylon
- Easily serviced internal module
- Stainless steel and brass hardware
- Vandal cap to avoid unauthorized use
- Five-year warranty

EASILY KEEP DOWNSTREAM PRESSURE CONSTANT



Simply turn the dial to the desired pressure

OPERATING SPECIFICATIONS

- Flow range: 1 to 300 GPM
- Inlet pressure range: Up to 200 psi
- Pressure regulation:
  OMR-30: 5 to 30 psi, OMR-100: 5 to 100 psi
- Inlet pressure must be 10 psi greater than outlet pressure

MODELS

Model	Description
A-OMR-30	Modular regulator 5-30 psi
A-OMR-100	Modular regulator 5-100 psi
A-OMR-DS	Downstream sensing kit


Controllers


Irritrol®

Kwik Dial® Controller

KwikDial® offers a unique combination of sophisticated features and simple operation. Excellent scheduling flexibility is provided by its automatic, semi-automatic and manual operations, a wide range of watering intervals, and the ability to make percentage changes to watering duration for seasonal adjustments. Peace of mind is ensured by the controller's electrical surge protection, a self-diagnostic, electronic circuit breaker and built-in memory that maintains time, date and programming information for 24 hours in the absence of AC power.

UNDERSTANDING PART NUMBERS

Example:
How to order

A- KD 12 -EXT

Model	Number of Stations	Outdoor/Indoor Mount Options
A-KD4-EXT	4	outdoor
A-KD6-EXT	6	outdoor
A-KD9-EXT	9	outdoor
A-KD12-EXT	12	outdoor

FEATURES & BENEFITS

Three independent programs
Allows differing watering days, start times, station run times and station assignments

Multiple watering day options
Provides flexibility to meet water restrictions and diverse plant requirements:
- Days-of-the-week watering
- Odd/even date watering with 31st day skip
- Repeating-day-interval watering (every day, every 2nd day, every 3rd day, etc., up to once every 31 days)
- Excluded-day option, when used with the odd/even day or day-interval

Compatible with KwikStart™ hand-held remote system
Provides convenient remote station start/pause/resume/off capability (KSR-KIT-K) for supplemental watering or inspection

Self-diagnostic, electronic circuit breaker
Identifies and overrides an electrical "short" in a valve or in valve wiring and continues to water operable stations

Sensor hookup with bypass switch compatible with irritrol's RainSensor™ Series
Saves water by shutting off the system during rain

Program stacking feature
Prevents program overlap

Electrical surge protection (on both input and output lines)
Resists damage from lightning storms and power surge

OPERATING SPECIFICATIONS

- Station run times: 1-240 minutes (4 hours) in 1-minute increments
- Start times: 3 per program for up to 9 daily starts

ELECTRICAL SPECIFICATIONS

- Transformer input: 120 V ac, 60HZ (220/240 V ac, 50 Hz)
- Transformer output: 24 V ac, .830 amps
- Maximum output per station: 24 V ac, .4 amp
- Maximum total output: 24 V ac, .8 amp (including master valve)
- Capacity: One station valve plus a master valve (or 24 V ac pump start relay) on at a time
- UL and CUL listed

DIMENSIONS

- Outdoor: H: 9", W: 6 7/8", D: 4"
- Indoor: H: 8 7/8", W: 6 1/8", D: 3"

OPTIONAL ACCESSORIES

- A-CMR-KIT remote system
- A-SR-1 pump start relay

Rain Dial® Controller

The Irritrol® Rain Dial-R now offers exceptional scheduling for speed of programming and maintenance. Additional features include rain sensor compatibility and more pump control for water well and booster pump applications. And best of all, the new Rain Dial-R programs just like the original–use only the features you need!

FEATURES & BENEFITS

Remote CONTROL ready
Compatible with CMR-KIT and KSR-KIT-K remote kits

Rain sensor ready
Sensor bypass switch and terminal for sensor hookup

Three independent programs
Programming flexibility to meet the needs of a wide variety of plant material on the landscape site

Three water day choices
- Any day of the week, skip days or odd/even dates
- Skip days and odd/even dates have day exclusion option

Water Budgeting
For quick changes to the watering durations of all stations on a program at one time or pre-set a change in water budget for each month.

365-day calendar for Odd/Even date watering
Meets the odd/even date watering mandates often used for landscape water reductions

Water well recovery (delay between stations)
Option of pump circuit ON or OFF during delay

Master Valve/Pump Start circuit Assignable per station
Stations requiring a booster pump can be supplied while other stations can run on street water pressure

Clear/erase memory by program
Saves time by quickly erasing only the program desired

Program stack or overlap option
Allows three programs/stations on at once or restricts operations to no overlapping station runs

Snap-out face panels
6, 9 and 12-station models all have 12-station terminal boards allowing interchangeable front panels to change station number

Manual station advance
During automatic, semi-automatic and station test cycles, allows quick advancement of operation up through the stations

UNDERSTANDING PART NUMBERS

Example:

How To Order:

A- RD 600 -EXT

Model	Number of Stations	Outdoor/Indoor Mount Options
A-RD600-EXT	6	outdoor
A-RD900-EXT	9	outdoor
A-RD1200-EXT	12	outdoor

OPERATING SPECIFICATIONS

- Station run times: 1-59 minutes in 1-minute increments or 1-5.9 hours in .1-hour (6 minute) increments
- Start times: 3 per program per day for 9 starts total
- Watering schedules per program:
  - Any day of the week
  - Skip days from 1 to 31 days between irrigation days
  - Odd or even date watering

ELECTRICAL SPECIFICATIONS

- Transformer input: 120V ac, 60Hz (220/240V ac, 50Hz available internationally)
- Transformer output: 24V ac, 1.25 amps
- Maximum output per station: 24V ac, .5 amps
- Maximum output to valves: 24V ac, 1.0 amps (including master valve/pump start circuit)
- Battery backup for "armchair" programming and keeping current time and date: 9-volt alkaline (not included)
- UL and CSA listed

OPTIONAL ACCESSORIES

- A-SR-1 pump start relay
- A-CMR-KIT remote system

Total Control® Controller

The Irritrol® Total Control-R Series controller is proof that advanced design controllers don't have to be complicated. Developed to meet a wide variety of watering requirements, the easy-to-program Total Control Series is available in models ranging from 6 to 24 stations. Programming flexibility is provided by four independent programs, 16 total start times and a 365-day calendar for odd/even day scheduling.

FEATURES & BENEFITS

New "R" models are remote-ready
For Irritrol's commercial maintenance remote (CMR-KIT)

Four independent programs offer concurrent operation capability
For scheduling flexibility

Seven-day calendar, odd/even day or day-interval options from one to 30 days
Provides the flexibility to meet water restrictions or plant watering requirements

Programmable master valve On/Off per program
Provides the flexibility of running some programs with a booster pump and some without

Non-volatile memory
Holds program during power failures for reliable operation

Snap-out face panels
Allows easy removal of control module without disturbing valve wiring for servicing and hassle-free station upgrade (from 6 to 9 or 9 to 12 and from 15 to 18 or 18 to 24)

Flexible station run and start times
Meet a broad range of watering requirements

6-, 9- and 12-station models have 12-station terminal boards; 15-, 18- and 24-station models have 24-station terminal boards
Allows for station count increase simply by changing face panel module

Sensor hookup with bypass switch compatible with Irritrol's RainSensor™ Series
Saves water by shutting off the system during rainfall

OPERATING SPECIFICATIONS

- Station run times: 1-240 minutes (4 hours) in 1-minute increments
- Start times: 3 per program for up to 9 daily starts

ELECTRICAL SPECIFICATIONS

- Transformer input: 120 V ac, 60HZ (220/240 V ac, 50 Hz)
- Transformer output: 24 V ac, .830 amps
- Maximum output per station: 24 V ac, .4 amp
- Maximum total output: 24 V ac, .8 amp (including master valve)
- Capacity: One station valve plus a master valve (or 24 V ac pump start relay) on at a time
- UL and CUL listed

OPTIONAL ACCESSORIES

- A-CMR-KIT remote system
- A-SR-1 pump start relay

UNDERSTANDING PART NUMBERS

Example:

How To Order:

A- TC 6 EX-B

Number of Stations

Model	Stations	Mount
A-TC-6EX-B	6	outdoor
A-TC-9EX-B	9	outdoor
A-TC-12EX-B	12	outdoor
A-TC-15EX-B	15	outdoor
A-TC-18EX-B	18	outdoor
A-TC-24EX-B	24	outdoor
A-TC-36EX-R	36	outdoor
A-TC-48EX-R	48	outdoor

Notes: 6 - 24 station models are manufactured in plastic cabinets. 36 and 48 station models are manufactured in larger metal cabinets (as pictured above).

MC-E Controller

The MC-E Series irrigation controller has advanced features designed for valve and pump control applications in agriculture, including a looping feature to reliably control misting, cooling and fogging in greenhouse and nursery applications. New flow monitoring and diagnostic features detect unscheduled flow events and alarms users. For small to large growers, the new MC-E has what it takes.

FEATURES & BENEFITS

Eight independent programs
Flexible scheduling for widely varied landscapes

Flow monitoring with diagnostics and 3 types of alarms (requires station #2 for a N/O master valve circuit)
Protects the system and saves water by detecting, reporting and handling high flow and unscheduled flow events

Models with station counts from 4 up to 48
Provides irrigation control for any size project

Commercial-grade, heavy-duty, lockable, weather resistant cabinets and pedestals
For long service life in demanding commercial and "heavy turf" applications

Backward compatible face panel to existing MC Plus-B cabinets on site
Allows field upgrades to the new MC-E while leaving cabinet/pedestal in place

OPERATING SPECIFICATIONS

- Watering day cycles per program:
  - Any days of the week
  - Odd or Even date watering
  - Day intervals from 1- 60 days
- Station run times:
  - 0-59 seconds in 1-second increments
  - 1 minute to 10 hours in 1-minute increments
- Global water budget & monthly water budget:
  - 0% to 255% in 1%-increments

ELECTRICAL SPECIFICATIONS

- Transformer input: 120V ac, 60 Hz
- Transformer output: 24V ac, 2.08 amps (50 VA)
- Maximum output per station: 24V ac, 1.24 amps
- Maximum output to valves: 24V ac, 1.68 amps (including master valve)

DIMENSIONS

- **4-12 Station:** H: 9 3/4", W: 10 1/2", D: 4 1/4"
- **18-48 Station:** H: 12", W: 14 1/4", D: 4 3/4"

OPTIONAL ACCESSORIES

- A-SR-1 pump start relay
- A-CMR-KIT (Commercial Maintenance Remote)

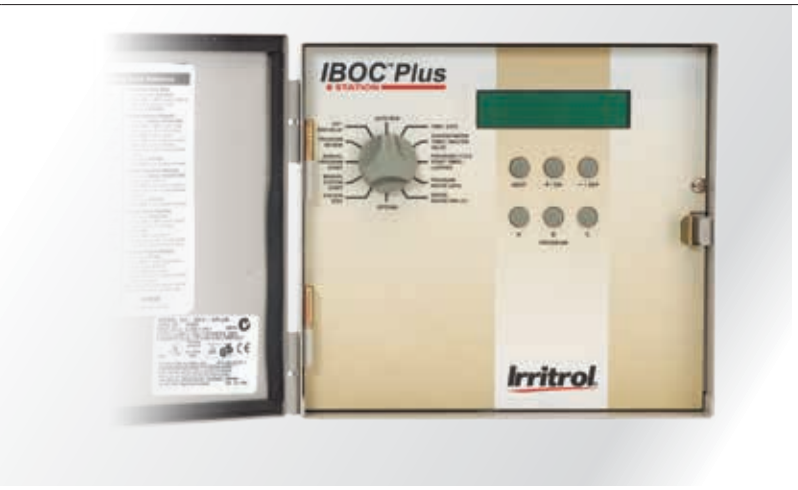
UNDERSTANDING PART NUMBERS

Example:
How to order

A- MC -12 E

Model	Number of Stations	Outdoor/Indoor Mount Options
A-MC-4E	4	outdoor
A-MC-6E	6	outdoor
A-MC-8E	8	outdoor
A-MC-12E	12	outdoor
A-MC-18E	18	outdoor
A-MC-24E	24	outdoor
A-MC-30E	30	outdoor
A-MC-36E	36	outdoor
A-MC-42E	42	outdoor
A-MC-48E	48	outdoor

IBOC Plus® Series



Designed to control irrigation systems with no A.C. power, the **Irritrol® IBOC® Plus controller** operates with a battery or it's optional SPC-2 solar power converter. For dependable performance in commercial applications, the IBOC Plus features a steel cabinet and key/lock door as well as an optional steel locking pedestal for free-standing installations.

OPTIONAL SOLAR POWER CONVERTER (A-SPC-2)

FEATURES & BENEFITS

Battery, 6V dc power or optional solar power
Provides operation in areas with no AC power

Commercial-grade, lockable steel cabinets and pedestals
For vandal resistance and longer service life

Three independent programs
Offer concurrent operation capability and scheduling flexibility

Odd/even day calendar with day exclusion; seven-day calendar; or one to 62 skip days
To match water restrictions and varied plant water requirements

Non-volatile memory
Retains all program data for reliable operation

Program cycle looping
Provides continuous program repeat operation within a selectable watering window for "grow in" periods

Solar Option

Solar power converter can be mounted up to 80 feet from IBOC Plus (SPC-2 option, sold separately)
Simple mounting on top of any IBOC Plus controller model or mounted up to 80 feet from the controller

Maintenance-free gel cell battery: (3-year life) inside solar converter

Solar load ratio: 6-to-1 (provides full power to IBOC Plus with only two hours of direct sunlight per day)

Output: 25-27 V dc/50mA

Solar amp/hrs. per day: 600mA, typical

Load amp/hrs. per day: 100mA, typical

Operation temperature: -22°F to +140°F (-30°C to +60°C)

Storage temperature: -40°F to +185°F (-40°C to +85°C)

OPERATING SPECIFICATIONS

- Station run times: 1-minute to 23 hours, 59 minutes
- Start times: 8 per program for up to 24 daily starts
- Watering schedule: 7-day calendar, odd/even day with day exclusion or 1-62 skip days
- Water budgeting: 10-200% in 10% increments

ELECTRICAL SPECIFICATIONS

- Powered by one 6-volt alkaline battery (not included) or one SPC-2 (solar power converter) sold separately
- Output: 24 V dc latching (A-DCL)
- Master valve output 24 V dc latching (A-DCL)
- Rain sensor input selectable per program
- Irritrol®, Hardie® and Richdel® valves must be converted from AC with 24 V dc latching solenoids (A-DCL)

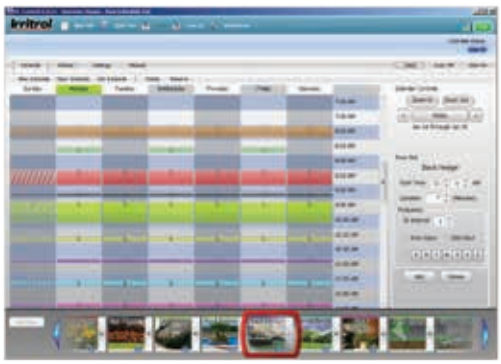
DIMENSIONS

- IBOC Plus: H: 9¼", W: 10¾", D: 5¼"
- SPC-2: H: 4⁹⁄₁₆", W: 10¾", D: 3⅜"

PC Control Controller

The first of its kind, Irritrol's computer-controlled controller increases installation and service productivity while providing the highest level of end-user convenience.

EXPERIENCE THE SIMPLICITY OF PC CONTROL.



FEATURES & BENEFITS

PC-compatible scheduling software
User-friendly software that is precise, flexible, and intuitive with its computer interface

2-way handheld remote with desktop stand
Provides the convenience of wirelessly programming the controller in the garage from the desk in the user's home office or den.

scheduling advisor℠
Saves water by adjusting the irrigation schedule when you send it out for the online weather forecast

Internet compatibility
Allows the owner to send schedules over the Internet. The installer or Irritrol Tech Support can alter the program and return it to the client

12-station controller with 2-way radio module
Acknowledges the receipt of a new program, stores it in memory and automatically runs it according to schedule. Controller installation and field wire hookup are the same as a conventional controller

Selectable Personal ID Number (PIN)
Unique, selectable number for each system's security prevents overlapping instructions from another PC Control system and reduces the chance of unauthorized program entry

System expandability up to 48 stations
To meet the need for larger systems, 12-station indoor or outdoor "add-on" controllers within range of the 2-way radio modules can be added. The system sees station #1 on the second controller as zone #13

Landscape lighting control
Allows up to 3 zones to be designated to run relays for control of landscape lighting. (Controller does not supply main power to the lighting.) SR-1 Pump Start Relay is recommended

Contractor settings default
With a click of the mouse, the owner can reactivate the original program

OPERATING SPECIFICATIONS

- Station run time: up to 24 hours (in hour and minute increments)
- Start times: 10 per zone per day (120 total)
- Watering day schedules selectable per zone: Any days-of-the-week watering, interval watering (selectable in 1-day increments) from daily to once every 30 days and Odd or Even date watering
- Day exclusion option for setting "non-water" days
- Optional rain sensor for multi-controller systems: Connect sensor to controller #1
- Rain sensor assignable per station
- Optional pump start relay for multiple controller systems: connect relay to controller #1 (for pump control)
- PIN number range: selectable from 0001 to 9999
- Range of two-way remote: 1,000' line-of-sight, less when obstructed.
- Customized semi-automatic programs

EASY SYSTEM EXPANSION UP TO 48 STATIONS

UNDERSTANDING PART NUMBERS

Example:

How To Order:

A-PC 12– XXX XXX

MODEL	STATIONS	CONFIGURATION	OPTIONS
A-PC - PC Control Controller	**12** - 12 Station	**EXT** - Outdoor **INT** - Indoor	**ADD** - Add-on controller **PAK** - Includes remote and disk

ELECTRICAL SPECIFICATIONS

- Transformer input: 120 V ac, 60HZ
- Transformer output: 24 V ac (30VA)
- Maximum output per station: 24 V ac, .4 amp
- Maximum total output: 24 V ac, 1 amp (including master valve)

DIMENSIONS

- Outdoor: H: 13", W: 7", D: 4 ¼"
- Indoor: H: 12 1/8", W: 6 1/8", D: 3"

SYSTEM REQUIREMENTS

- Windows-compatible PC
- Windows XP Home Edition, XP Professional or 2003, Vista or Windows 7
- Available USB 1.0 (or greater) port
- 900 MHz CPU
- 64 MB RAM and CD-ROM drive
- 20MB free hard disk space
- 1024 x 768 64k color display/monitor (800 x 600 minimum)
- Keyboard and pointing device (mouse)
- Internet connectivity (high speed)

OPTIONAL ACCESSORIES

- A-SR-1 pump start relay

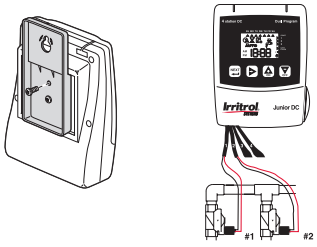
LATEST SOFTWARE UPDATE

- Software version: On HELP page click on UPDATES for latest version of software
- Send individual schedules over the Internet
- Diagnostic circuit breaker alerts user to short circuits right on zone photos
- Available as a FREE online upgrade

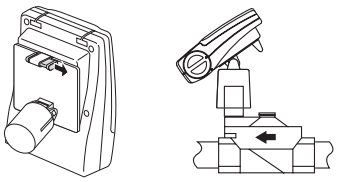
Junior DC™ Controller

When AC power is a problem, the **JUNIOR DC** battery-operated controller is the solution. Whether for temporary operations like irrigation system wire repairs or permanent applications where AC power to the valves is expensive or impractical, the JUNIOR DC controller can handle the job. And because valve boxes occasionally flood, these valve-mounted controllers are waterproof. For water savings, JUNIOR DC controllers are compatible with wired rain sensors.

JUNIOR DC WALL INSTALLATION



JUNIOR DC VALVE MOUNTED



FEATURES & BENEFITS

Battery-Operated
Provides automatic irrigation in areas without A.C. power

Waterproof (IP68)
To survive the occasional flooded valve box..

Valve Mounted Or Wall Mount Option
Mount right on the D.C. solenoid or wall mount up to 900' away

1- and 4-Station Model
For temporary power to one valve or permanent power to a system without A.C.

Compatible With Wired Rain Sensor
Saves water by preventing irrigation during a downpour

Use Irritrol A-DCL, DC Latching Solenoid

OPERATING SPECIFICATIONS

- 3 Start Times per program
- Watering Time: 1-155 minutes (in 1-minute increments)
- Water Budgeting (10% to 200%)
- 7-day "select day" watering schedule or day intervals from 1-14 days

ELECTRICAL SPECIFICATIONS

- Uses one, 9-volt, Alkaline battery
- Output to solenoid is a DC pulse
- Use with Irritrol DC latching solenoid (A-DCL) and Irritrol valves
- UL listed
- Maximum wire length to DCL: 660' to 960' depending on wire gauge (see below)

Wire Size	Maximum Wire Length
#18	660 feet
#16	800 feet
#14	960 feet

MODELS

Model	Description
A-JRDC-1	1-station
A-JRDC-4	4-station

DIMENSIONS

- 1 station: H: 1½", W: 1¾", D: 3¾"
- 4 stations: H: 1½", W: 1", D: 3"

A-CMR-Kit

Maintenance Remote

The Irritrol® **CMR-KIT** portable remote control system saves labor, time and money on irrigation system maintenance and troubleshooting. Designed as a 1-person maintenance kit, the long range CMR (up to 1.5 miles) is easy to use and rugged enough for almost any application. The kit also includes an AC recharging unit for the NIMH batteries (not included), and all the components come in a handy carrying case.

ADDED FEATURES

- Large, easy-to-read LCD display
- Easy-to-use keypad
- Receiver indicator light for "power" and "valid" signal
- Settable station limit on the transmitter
- Two-year warranty

OPERATING SPECIFICATIONS

- Commands available:
  - Turn transmitter On or Off
  - Turn station On or Off
  - Move to next or previous station (manual advance)
  - Pause or un-pause current station's operation
  - Start 2-minute test run for all stations in sequence

FEATURES & BENEFITS

Complete remote control kit in a carrying case
Includes transmitter, receiver, circular mount connector and cable assembly, 110Vac charger (for the transmitter) and user's guide in one convenient and portable case (batteries not included)

Up to 1.5 miles range (line-of-sight) and typically ½ mile in urban areas
Provides operating range for larger projects

Programmable addresses up to 999
Allows transmission of commands to specific controllers even though others are within range in permanent mount applications

Remotely controls up to 99 stations
Ready for future, larger station-count controllers

Quick connect/disconnect system
Allows receiver to be easily moved from one controller to another

Requires rechargeable NiMH battery pack (not included) and includes 110V ac charger
Allows recharging for the transmitter to save on battery purchases

ELECTRICAL AND RADIO FREQUENCY SPECIFICATIONS

- Receiver frequency: MURS designated channels (151.82MHz, 151.88MHz, 151.94MHz, 154.57MHz, 154.6MHz)
- Receiver operates on 24V ac power from the controller
- No FCC license required
- Receiver input: 22-26V ac with a current draw of <75mA AC
- Communication range: up to 1.5 miles (line-of-sight)
- Transmitter operation:
  - 4 AA NiMH batteries required (Alkaline batteries included)
  - Detects and avoids busy channels
  - FM modulation (VHF)

MODELS

Model	Description
A-CMR-KIT	Commercial maintenance remote kit with case
A-CMR-TX*	Transmitter
A-CMR-RX*	Receiver
A-CMR-CC*	Circular connector/cable/bracket

OPTIONAL ACCESSORIES

- A-CMR-ANT antenna
- A-CMR-CHG* wall charger

COMPATIBLE WITH

- Rain Dial®-R Series, KwikDial® Series, MC-E Series and Total Control®-R Series

* Also sold separately

Pump Start Relay

With a lockable, vandal- and weather-resistant case, the Irritrol® SR-1 can be mounted indoors or outdoors to provide reliable switching control for pumps or other electrical devices from the controller.

FEATURES & BENEFITS

Electrical relays for both low voltage (24V ac) control switching and high voltage (120V ac or 240V ac) main power contacts

- Allows remote pump switching using 24V ac output from an irrigation controller's master valve/pump start circuit
- Opens and closes main power contacts for pumps (1HP at 120V ac 1 Phase or 2HP at 250V ac 1 Phase)

Note: 2HP at 120V ac will exceed maximum amp rating.

Highly efficient 0.1 Amp operating requirement
Draws less holding power than most solenoid valves

Can also be used with the Irritrol PC Control system for switching control of low voltage landscape lighting
Saves the expense of an extra timer and puts irrigation and landscape lighting control in one location on the owner's computer

ADDED FEATURES

- Enclosed, weather-resistant case
  - Allows the flexibility of indoor or outdoor mounting
- Five-year warranty

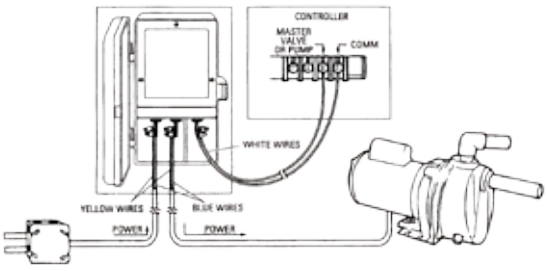
ELECTRICAL RATINGS

- Contacts: Up to 1 HP at 120V ac, 1 Phase Up to 2 HP at 250V ac, 1 Phase (20A at 250V ac)
- Coil: 24V ac, 3VA (19V ac Min, 30V ac Max)
- Coil Draw: 0.1Amp

DIMENSIONS

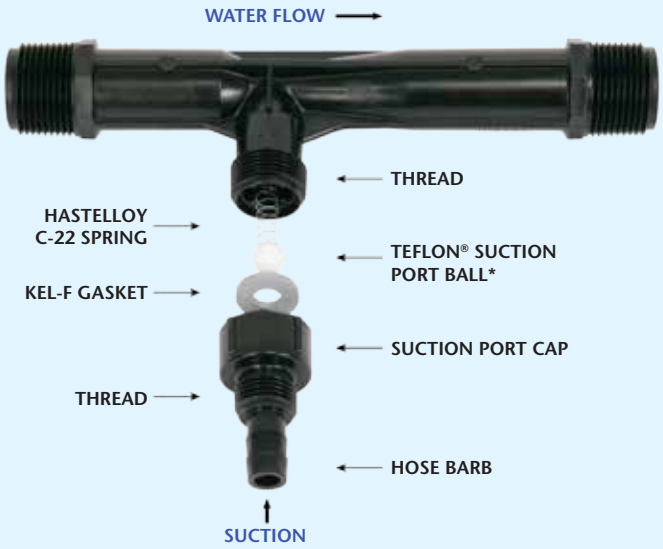
- H: 9 1/2", W: 6 1/4", D: 3 3/4"

A-SR-1 AS A PUMP START RELAY



Injectors

Chemical Injectors



*Teflon® is a registered trademark of the Dupont Company, which has no affiliation with Mazzei Injector Company.

Mazzei injectors offer an economical highly efficient means of injecting liquids, such as chlorine, fertilizers, and other agricultural chemicals, into a pressurized water system. Mazzei injectors use differential pressure to create a low-pressure zone which draws the chemicals into a pressurized water line.

OPERATION

Mazzei injectors are venturi-type injectors:
When pressurized water enters the injector inlet, it is constricted toward the injection chamber and changes into a high-velocity jet stream. The increase in velocity through the injection chamber results in a decrease in pressure, thereby enabling an additive material to be drawn through the suction port and entrained into the water stream. As the jet stream is diffused toward the injector outlet, its velocity is reduced and it is reconverted into pressure energy (but at a pressure lower than injector inlet pressure).

APPLICATION

- Agricultural irrigation systems using drip and/or sprinkler irrigation, or any pressurized water system where a gas or liquid needs to be injected

FEATURES AND BENEFITS

- Saves labor
- Safe to use as the chemicals are under vacuum, not pressure
- Ensures even distribution of chemicals
- No external power source is required in most systems
- Low maintenance - no moving parts
- Chemicals cannot be injected when the irrigation system is off
- Available in Polypropylene or PVDF (Kynar®) - Kynar is extremely resistant to most chemicals, including acids
- Available with NPT or BSPT threads
- Injector Selection Tool available at www.toro.com

WHY PVDF (KYNAR)

Kynar is extremely resistant to most agricultural chemicals: Sulfuric acid, Nitric acid, Chlorine, and Gypsum (Gypsum is very abrasive). Polypropylene is not recommended for the above materials.

UNDERSTANDING PART NUMBERS

Example part number:
AIV1583A-P (1.5" MNPT black poly injector)

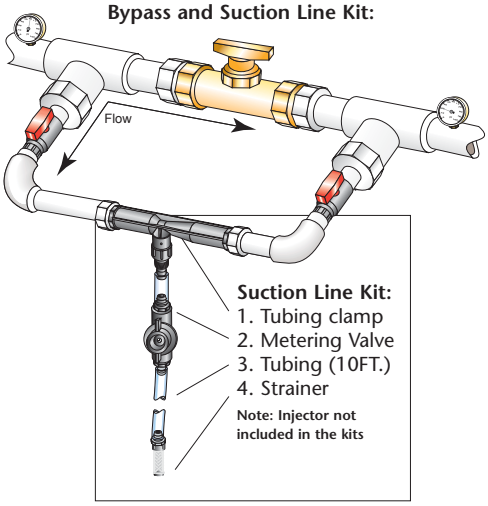
XXX **XXXXX** - **XXX**

(blank)	PVDF (Kynar®)
P	Polypropylene black
PPG	Polypropylene green

Injector model number

AIV	NPT threads
AIC	BSPT threads

Bypass and Suction Line Kit:



Injector Performance Table

Water Suction Capacity • Injector Inlet Pressure 5-50 PSIG

Operating Pressure PSIG		Model 283 1/2" Threads		Model 287 1/2" Threads		Model 384 1/2" Threads		Model 384X 1/2" Threads		Model 484 1/2" & 3/4" Threads		Model 484X 3/4" Threads	
Injector Inlet	Injector Outlet	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH
5	0	0.17	3.2	0.29	5.2	0.7	10.3	0.7	11.7	1.2	14.6	1.2	23.5
	1		2.0		2.6		8.7		8.7		10.5		16.7
	2		1.1		1.8		7.5		4.0		6.7		11.9
	3				1.2		5.1				1.0		7.4
	4	(3.5)		(3.5)		(3.9)		(2.9)		(4.4)		(3.5)	
10	0	0.24	4.7	0.32	6.2	1.0	15.3	1.0	17.5	1.7	18.8	1.7	29.8
	2		2.8		4.8		11.5		13.6		14.0		23.1
	5		1.2		1.9		7.6		2.0		6.1		11.9
	7				0.8		2.1				2.8		3.8
	8	(7.0)		(7.7)		(8.2)		(6.6)		(8.4)		(7.5)	
15	0	0.28	5.4	0.42	6.8	1.2	13.4	1.2	27.8	2.1	18.8	2.1	38.7
	5		2.7		4.1		11.4		11.7		11.4		21.0
	7		1.7		2.9		8.5		4.2		8.3		15.7
	10				1.3		4.9				1.0		
	12	(10.5)		(11.5)		(12.9)		(9.6)		(12.5)		(9.6)	
20	0	0.32	5.8	0.51	7.0	1.4	13.1	1.4	29.7	2.4	18.0	2.4	39.5
	5		3.7		6.1		13.2		17.2		15.7		27.7
	10		2.0		3.4		9.3		3.0		9.5		13.4
	12		0.6		1.9		6.4				7.8		8.4
	15	(15.0)		(16.0)	0.5	(16.5)	2.5	(12.4)		(17.0)	1.0	(13.2)	
25	0	0.35	5.9	0.58	7.8	1.6	14.2	1.6	33.1	2.7	17.9	2.7	39.6
	5		4.8		6.9		14.3		22.4		17.3		32.1
	10		2.6		4.4		12.7		11.2		13.8		22.0
	15		0.7		2.3		6.7				7.4		9.9
	20	(18.5)		(19.5)		(20.5)		(15.0)		(21.6)	1.0	(16.5)	
30	0	0.39	6.0	0.65	8.0	1.7	14.2	1.7	33.9	2.9	17.2	2.9	39.8
	5		5.8		7.9		14.4		24.7		17.0		38.1
	10		3.8		5.6		13.9		17.3		16.6		28.8
	15		2.4		3.6		10.7		7.0		11.3		17.0
	20		0.8		1.7		4.5				7.1		
	25	(22.5)		(24.5)		(25.2)		(18.0)		(25.5)		19.8)	
35	0	0.41	6.0	0.70	8.1	1.9	14.5	1.9	33.8	3.2	17.3	3.2	40.3
	5		6.0		8.0		14.5		29.1		17.4		39.3
	10		4.8		6.8		14.5		19.2		17.4		33.9
	15		3.4		5.0		13.7		10.7		17.4		24.3
	20		1.7		3.0		9.4				11.1		14.8
	25	(26.0)	0.6	(27.0)	1.1	(28.6)	3.0	(20.8)		(29.5)	4.0	(23.5)	
40	0	0.43	6.0	0.75	8.1	2.0	14.2	2.0	34.0	3.4	17.1	3.4	40.8
	5		6.0		8.1		14.2		31.6		17.7		38.7
	10		5.5		7.4		14.0		24.1		17.7		38.5
	15		4.2		6.3		14.0		14.3		17.7		29.9
	20		2.6		4.3		12.6		3.6		15.2		20.7
	25		1.2		2.7		7.5				11.4		6.5
	30	(29.5)		(31.0)	0.3	(32.0)	2.0	(22.8)		(33.3)	4.0	(26.1)	
45	0	0.46	6.0	0.81	8.1	2.1	13.7	2.1	33.9	3.6	17.2	3.6	41.4
	5		6.0		8.1		13.8		31.6		17.2		39.1
	10		5.8		8.1		13.8		30.8		17.5		37.9
	15		4.9		6.9		13.7		19.0		17.5		35.0
	20		3.4		5.5		13.8		11.1		16.7		26.9
	25		2.7		4.0		12.2		1.4		13.9		18.2
	30		1.0		2.4		6.1				10.3		
	35	(33.5)		(35.0)		(36.1)		(26.1)		(36.8)	3.7	(29.6)	
50	0	0.48	6.0	0.85	8.3	2.2	14.1	2.2	33.9	3.8	17.4	3.8	41.7
	5		6.0		8.3		14.1		32.8		17.4		40.5
	10		6.0		8.3		14.1		31.7		17.7		39.2
	15		5.7		8.0		14.1		25.3		17.7		37.4
	20		4.7		5.9		13.6		15.2		17.7		29.5
	25		3.5		4.5		13.6		6.7		16.5		20.3
	30		2.1		3.0		10.1				12.7		8.2
	35		0.7		1.2		6.1				7.8		
	40	(37.0)		(39.0)		(39.6)		(28.7)		(41.0)		32.6)	

** Numbers in parenthesis indicate the injector outlet pressure when suction stops (Zero Suction Point). **

Injector Performance Table

Water Suction Capacity • Injector Inlet Pressure 5-50 PSIG

Operating Pressure PSIG		Model 584 1/2" & 3/4" Threads		Model 684 3/4" Threads		Model 878 1" Threads		Model 885X 1" Threads		Model 1078 1" Threads		Model 1583A 1.5" Threads	
Injector Inlet	Injector Outlet	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH
5	0	2.1	29.2	3.5	27.4	3.7	62.9	3.6	78.1	5.5	101.5	10.7	135.8
	1		28.9		20.3		36.1		62.6		46.4		84.5
	2		28.5		13.8		23.8		42.7		22.2		53.3
	3		25.4		6.6		7.3		15.5		2.7		
	4	(4.4)	10.0	(4.3)	5.6	(4.0)	1.7	(4.0)		(4.0)		(4.4)	
10	0	3.0	28.3	5.0	27.2	5.2	93.8	5.0	115.9	7.7	105.8	15.2	219.9
	2		28.2		27.3		62.0		90.8		75.7		143.8
	5		27.5		18.5		36.5		44.8		41.8		78.8
	7		13.3		10.9		15.8		19.4		19.2		42.0
	8	(9.0)	11.0	(8.5)	6.1	(8.7)	3.7	(7.5)		(8.1)	4.4	(8.6)	
15	0	3.6	28.2	6.1	26.1	6.3	87.4	6.2	135.3	9.5	101.3	18.6	225.2
	5		27.9		26.1		62.1		83.2		79.9		163.8
	7		28.0		25.1		45.5		58.0		64.7		124.4
	10		14.0		12.9		23.6		19.2		34.3		86.5
	12	(13.5)	11.0	(13.0)	7.0	(12.5)	7.2	(11.0)		(13.1)	17.0	(13.0)	14.6
20	0	4.2	24.8	7.0	25.1	7.3	82.9	7.1	141.9	11.0	98.2	21.5	228.0
	5		24.8		25.2		80.5		117.4		95.4		205.4
	10		23.7		25.2		48.6		57.7		70.0		143.5
	12		19.2		18.4		33.6		36.2		51.5		131.7
	15	(18.0)	14.6	(16.5)	10.4	(16.5)	21.0	(14.0)		(17.3)	30.3	(17.9)	66.2
25	0	4.7	25.2	7.8	24.8	8.2	82.3	8.0	142.7	12.2	96.0	24.0	226.8
	5		25.2		24.9		81.3		135.8		96.7		226.4
	10		25.1		24.9		73.2		96.5		89.4		193.9
	15		20.8		24.4		45.3		38.4		68.2		148.1
	20	(22.0)	12.2	(21.0)	5.2	(21.0)	20.1	(17.0)		(21.9)	31.9	(22.1)	49.0
30	0	5.1	25.3	8.6	24.5	9.0	79.9	8.7	144.1	13.4	94.4	26.3	226.5
	5		25.4		24.6		79.2		140.7		94.5		226.4
	10		24.9		24.6		77.0		125.3		94.5		211.6
	15		25.2		24.6		65.4		69.3		82.1		167.3
	20		18.2		14.7		35.4		14.3		55.4		125.5
	25	(27.0)	11.6	(26.0)	6.8	(26.1)	9.1	(20.5)		(26.0)	17.9	(26.0)	18.3
35	0	5.5	25.5	9.3	24.7	9.7	79.4	9.4	142.4	14.5	94.0	28.4	226.7
	5		25.5		24.6		79.4		141.7		94.0		226.5
	10		25.4		24.7		77.5		135.7		94.0		224.2
	15		25.3		24.8		74.5		106.7		91.9		205.7
	20		21.9		24.9		52.3		54.2		74.1		164.8
	25	(31.5)	16.5	(29.5)	12.9	(30.1)	30.3	(24.0)		(30.0)	47.3	(29.4)	89.1
40	0	5.9	25.6	9.9	25.0	10.3	77.5	10.1	141.0	15.5	93.2	30.3	227.3
	5		25.6		25.0		77.5		141.1		93.2		228.7
	10		25.6		25.1		77.5		139.1		93.2		227.2
	15		25.5		25.0		77.5		128.0		93.2		220.5
	20		25.2		25.1		73.6		90.5		91.9		192.8
	25		21.3		24.7		50.6		36.9		72.2		153.4
	30	(35.5)	15.0	(35.0)	10.8	(34.4)	28.2	(27.0)		(34.4)	42.7	(33.4)	81.5
45	0	6.3	25.9	10.5	25.0	11.0	79.6	10.7	140.9	16.4	92.8	32.2	227.9
	5		26.0		25.0		79.6		139.7		92.8		228.3
	10		26.0		25.0		79.6		139.2		92.8		228.0
	15		25.9		25.1		79.6		134.8		92.8		223.5
	20		25.7		25.1		78.8		112.1		93.9		212.4
	25		23.6		25.1		67.0		74.5		86.9		174.9
	30		19.4		20.6		44.2		23.2		66.2		113.1
	35	(40.0)	13.5	(37.5)	8.4	(38.4)	22.0	(31.0)		(38.7)	36.7	(37.5)	47.1
50	0	6.6	25.6	11.1	25.0	11.6	74.8	11.3	139.6	17.3	92.4	33.9	227.4
	5		25.6		25.0		74.8		140.5		92.4		227.4
	10		25.6		25.0		74.8		140.5		92.4		226.3
	15		25.5		25.1		74.8		139.1		92.4		225.6
	20		25.4		24.9		74.8		128.1		92.4		224.4
	25		24.5		25.0		68.3		106.8		92.4		203.7
	30		21.6		17.1		56.2		59.0		86.4		172.4
	35		15.8		9.2		36.6		12.9		64.3		120.6
	40	(45.0)	2.8	(42.0)	6.7	(42.3)	9.6	(36.0)		(43.9)	35.0	(41.9)	40.5

** Numbers in parenthesis indicate the injector outlet pressure when suction stops (Zero Suction Point). **

Injector Performance Table

Water Suction Capacity • Injector Inlet Pressure 5-50 PSIG

Operating Pressure PSIG		Model 1585X 1.5" Threads		Model 1587 1.5" Threads		Model 2081 2" Threads		Model 2083X 2" Threads		Model 3090 3" Threads		Model 4091 4" Threads	
Injector Inlet	Injector Outlet	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH	Motive Flow GPM	Water Suction GPH
5	0	10.7	123.5	17.7	244.3	34	630	8.4	456	76	1050	170	2100
	1		74.8		102.9		630		158		900		1500
	2		26.3		91.5		630				756		1200
	3				54.2		215				456		840
	4	(3.5)		(4.1)		(4.5)	136	(1.4)		(4.0)		(4.5)	360
10	0	15.2	241.5	25.0	269.7	48	630	13.1	561	108	1446	214	2820
	2		155.9		249.1		630		154		1446		2820
	5		43.4		103.7		468				870		1860
	7				58.3		149				396		780
	8	(6.5)		(8.7)	14.4	(9.0)	30	(2.4)		(8.5)		(8.8)	240
15	0	18.6	262.0	30.7	270.6	59	631	16.1	671	132	1434	251	2820
	5		157.7		184.7		623				1428		2820
	7		86.6		154.2		576				1044		2280
	10				98.6		213				552		720
	12	(9.4)		(13.5)	38.0	(13.3)	77	(3.7)		(13.5)	300	(13.1)	360
20	0	21.5	308.6	35.4	267.1	68	631	18.9	757	153	1416	272	2820
	5		231.9		265.7		631		237		1416		2820
	10		120.2		174.6		468				1170		2700
	12		39.3		142.0		299				792		1800
	15	(12.7)		(17.0)	88.0	(17.5)	152	(5.7)		(17.0)	432	(17.5)	720
25	0	24.0	324.6	39.6	265.2	77	631	21.8	812	171	1344	307	2820
	5		275.5		264.9		631		429		1344		2820
	10		204.5		229.6		627				1356		2820
	15		50.5		156.8		404				930		1980
	20	(15.4)		(22.1)	55.1	(22.3)	134	(7.1)		(21.5)	114	(21.7)	420
30	0	26.3	323.1	43.3	263.5	84	631	23.1	849	187	1308	332	2820
	5		299.7		261.5		631		780		1308		2820
	10		251.2		268.3		631				1308		2820
	15		137.5		200.4		511				1284		2580
	20				164.8		341				576		1380
	25	(19.3)		(25.6)	33.4	(26.0)	62	(8.8)		(25.5)		(26.0)	240
35	0	28.4	326.3	46.8	285.7	91	631	24.4	853	202	1290	360	2820
	5		318.1		284.7		631		670		1290		2820
	10		286.7		287.7		631		288		1266		2820
	15		204.1		251.8		627				1266		2820
	20		66.7		191.7		460				906		2640
	25	(22.4)		(29.0)	143.8	(30.5)	256	(10.4)		(29.5)	396	(30.5)	1440
40	0	30.3	324.3	50.0	287.0	97	631	26.4	897	216	1254	382	2820
	5		321.3		284.9		631		920		1254		2820
	10		307.8		282.6		631		389		1254		2820
	15		257.1		278.4		631				1254		2820
	20		146.6		244.5		524				1110		2820
	25		11.9		180.3		394				714		1860
	30	(25.5)		(33.2)	115.5	(33.5)	169	(11.6)		(32.5)	228	(35.0)	900
45	0	32.2	326.0	53.1	259.8	103	631	27.7	948	229	1260	402	2820
	5		324.1		259.2		631		749		1260		2820
	10		318.1		260.4		631		486		1260		2820
	15		287.2		257.1		631				1260		2820
	20		210.2		256.9		607				1200		2820
	25		106.9		225.9		508				960		2820
	30				157.1		341				582		2400
	35	(28.7)		(38.3)	73.5	(38.0)	149	(13.4)		(36.0)		(38.9)	960
50	0	33.9	323.0	56.0	260.5	108	631	28.6	1175	242	1236	416	2820
	5		319.3		259.7		631		1278		1236		2820
	10		315.5		259.7		631		579		1236		2820
	15		296.7		258.3		631				1236		2820
	20		251.8		257.3		631				1236		2820
	25		156.8		252.4		588				1194		2820
	30		45.4		205.4		453				882		2640
	35				137.2		300				498		1620
	40	(32.4)		(41.0)	75.1	(41.5)	115	(14.4)		(40.5)		(43.1)	360

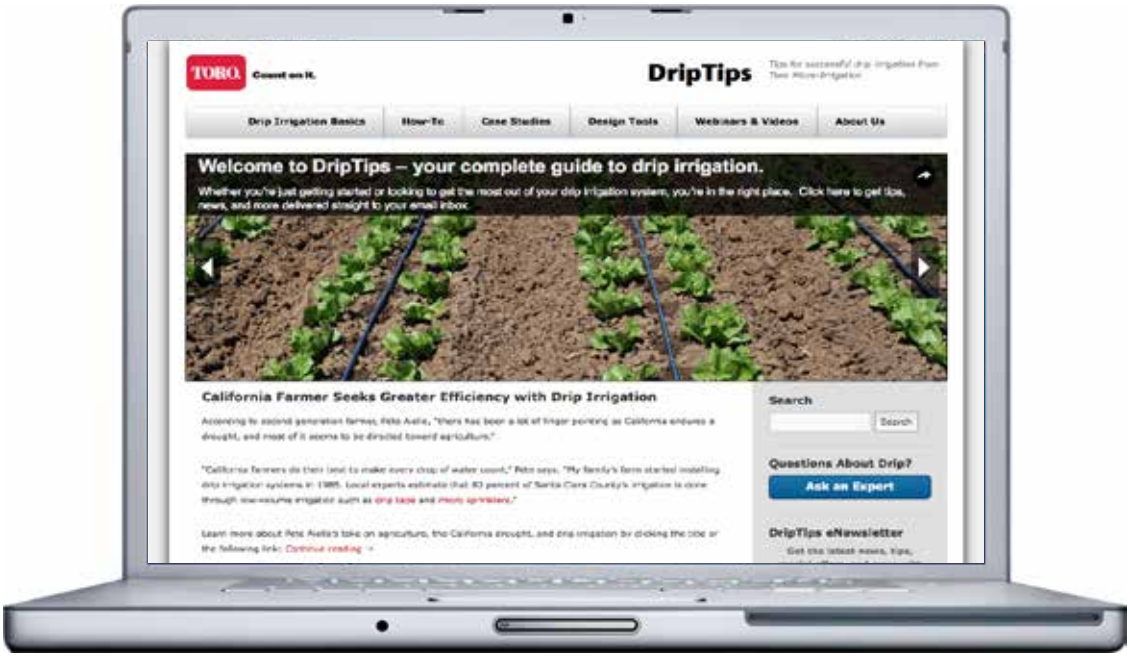
** Numbers in parenthesis indicate the injector outlet pressure when suction stops (Zero Suction Point). **

Count on it.

Educational Resources

Educational Resources

DripTips - Educational Website & Blog
driptips.toro.com



Whether you're just getting started or want to know how to get the most out of your drip irrigation system, driptips.toro.com is the right place. At DripTips, you'll find drip irrigation best practices, how-to guides, tips, trends, videos, drip irrigation case studies, and links to the latest drip irrigation news. And while you're at it, sign up for the DripTips eNewsletter to get the latest news, tips, special offers, and more delivered straight to your email inbox. Or, you can follow us on our twitter feed, @driptips.

Grower Connection

At Toro, we believe that our responsibility to our customers doesn't stop once our products are sold. So we created the Toro Grower Connection program to connect growers, farmers, and end-users with Toro's trained drip irrigation experts. Our local Grower Specialists can answer all of your crop or application questions, provide design, installation, and maintenance advice, as well as direct you to one of our local dealers.

So feel free to contact us with any questions about our products or your experiences, and we'll make sure to provide service that is just as dependable as our products. To contact your local Grower Specialist, please send an email to driptips@toro.com, and our closest representative will respond shortly. Or, feel free to contact our world-class customer service team at (800) 333-8125.

Drip Irrigation Owner's Manual

This new Drip Irrigation Owner's Manual provides a comprehensive guide for both new and existing row, field, and permanent crop growers. Topics include drip irrigation system overview, starting-up your drip irrigation system, basic system operation, fertigation, chemigation, salinity management, system maintenance, and maximizing your investment. The Drip Irrigation Owner's Manual heavily references both government and academic sources, is beautifully illustrated, and is simply written in lay terms. It is a "must have" reference for any serious irrigator. To purchase or download a copy, visit toro.com or driptips.toro.com.

Education Brochures

Our popular educational literature, known as the "Solutions" brochures, provide information on several drip irrigation topics. In these pieces, we examine real-life testimonials, explore the advantages of closely spaced emitters, and offer crop-specific drip tips. To learn more, visit toro.com or driptips.toro.com.

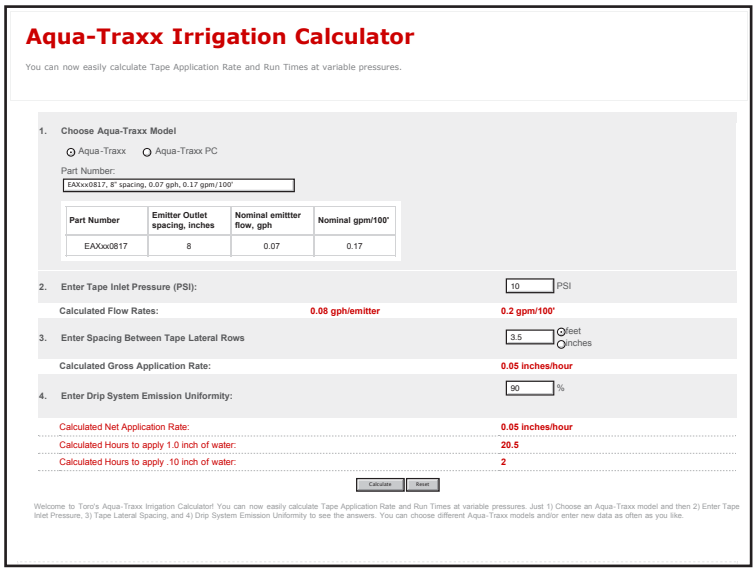
Educational Resources

Drip Irrigation Payback Wizard

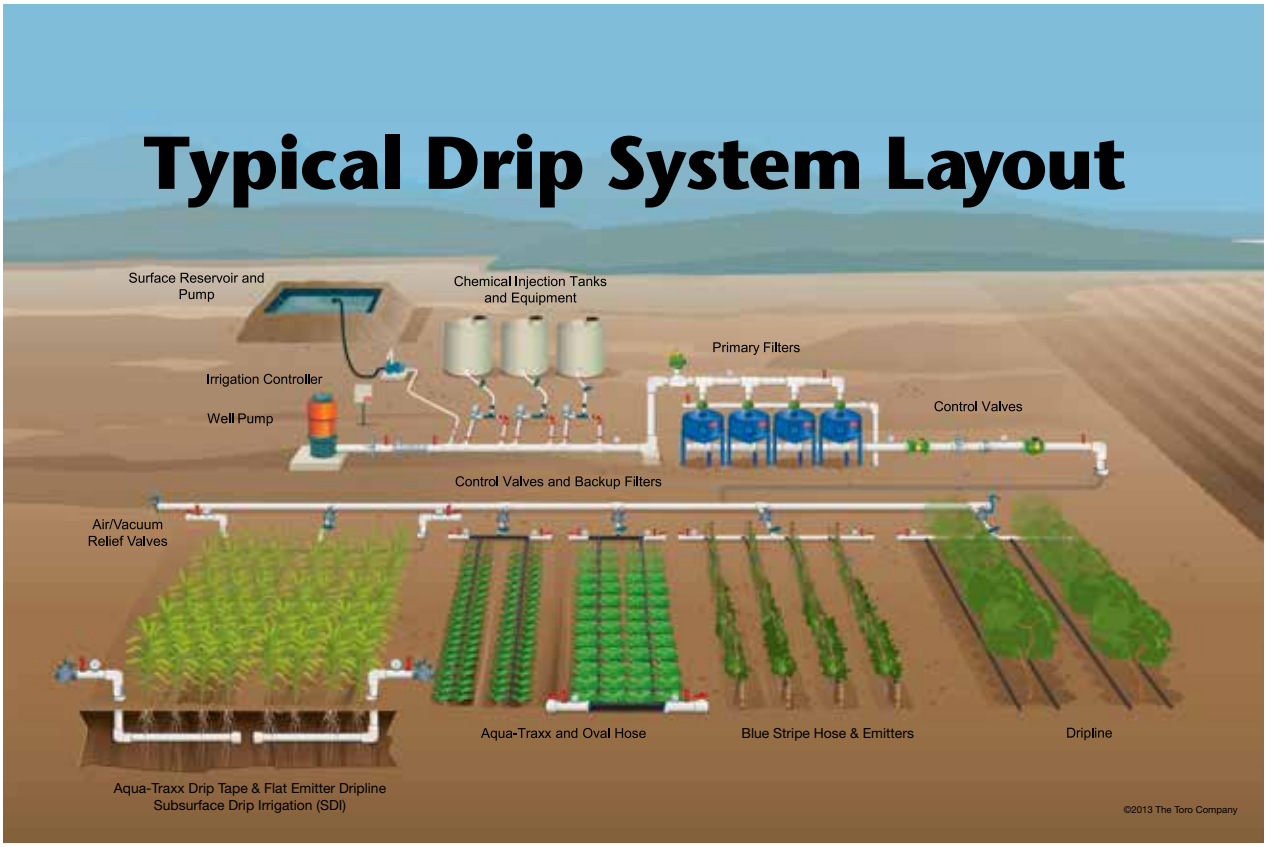
In as few as five steps, the Drip-Micro Irrigation Payback Wizard will quickly provide an estimate of how long it will take to recover the costs of investing in a drip irrigation system and estimate how many additional acres could be irrigated with conserved water. To get a free estimate, visit toro.com or driptips.toro.com

Aqua-Traxx Irrigation Calculator

Now you can easily calculate Tape Application Rate and Run Times at variable pressures. Check out our Aqua-Traxx Irrigation Calculator at or toro.com or driptips.toro.com.



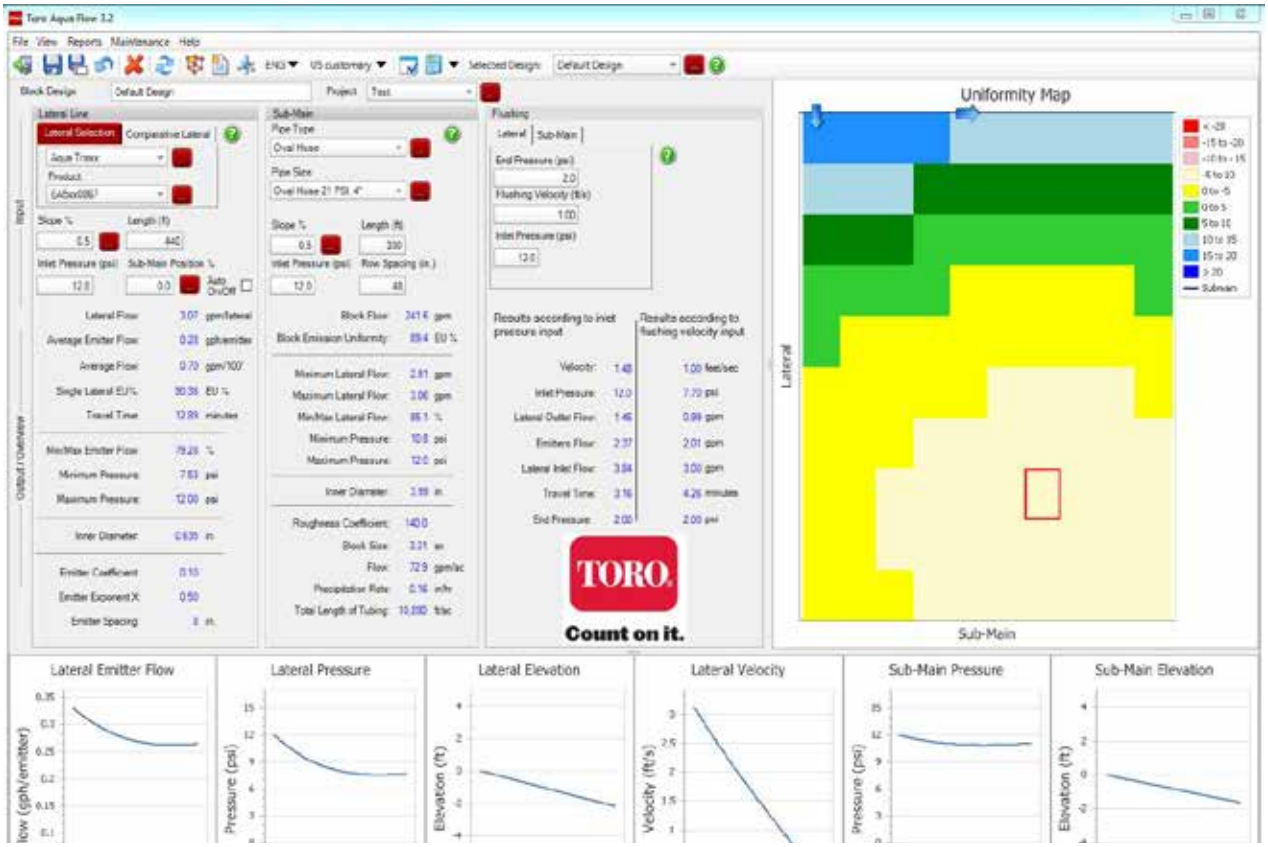
Typical Drip System Layout



The "Typical Drip System Layout" illustration has been developed to help those who are unfamiliar with drip irrigation understand basic drip irrigation system components and concepts. The illustration is organized into two halves. First, the "headworks" portion of a drip irrigation system shows the typical water sources, pumps, filters, chemical injection equipment and controls used in a drip irrigation system. Second, the "field" portion of the drip irrigation system shows typical layouts for five different types of drip irrigation: field crop subsurface drip irrigation (SDI), short term vegetable crop, longer term vegetable crop, vineyard and orchard. Although every application and design will be different than this illustration, it provides a starting point for discussion with viewers unfamiliar with drip irrigation.

Educational Resources

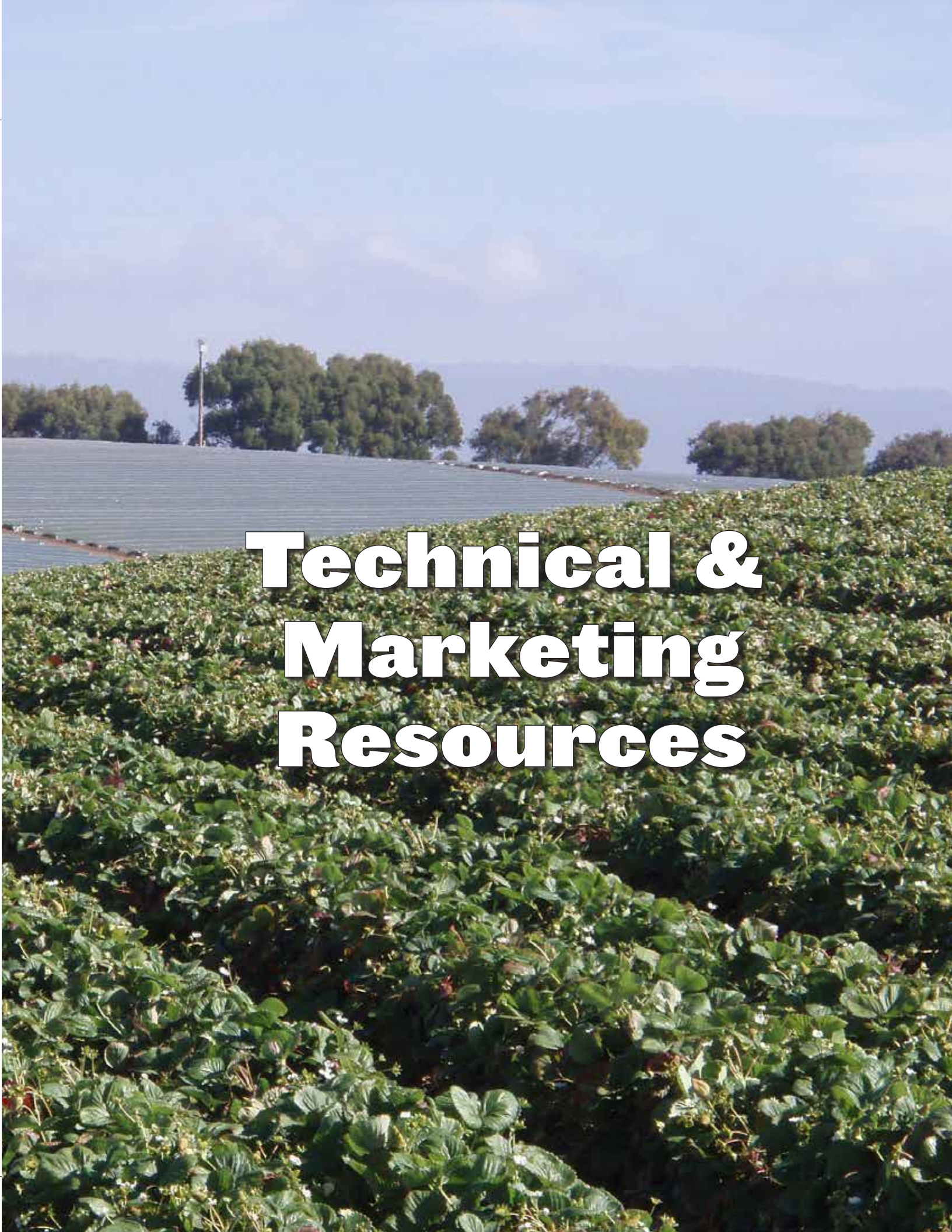
AquaFlow Drip Irrigation Design Software



The new and improved AquaFlow Drip Irrigation Design Software provides irrigation designers with the functionality of previous Toro software programs, and more. This state-of-the-art tool allows drip irrigation designers to configure drip irrigation systems for optimum performance using Toro's Aqua-Traxx® and Aqua-Traxx PC drip tape, as well as BlueLine® Classic and BlueLine PC dripline. Some of the features of the new software include:

- Dashboard format for easy viewing
- Real-time system design changes
- Compare different designs
- Color-coded uniformity display
- Unlimited slopes
- Multiple pipe types and sizes
- English or Spanish languages
- Single or multiple block reports
- Flushing for both laterals and submains

Visit toro.com or driptips.toro.com to become a registered user of AquaFlow and receive download and update information.



Technical & Marketing Resources

Friction Loss Charts

Friction Loss Charts for ID Controlled Hose

Losses in psi per 100 feet of hose (psi/100 ft) for hose sizes: 13 mm (.510") ID through 16 mm (.615") ID

Part No.		EHD1335		EHD1348		EHD1350		EHD1443		EHD1554		EHD1635		EHD1642		EHD1645	
Nom. ID		0.509"		0.513"		0.519"		0.553"		0.572"		0.616"		0.627"		0.616"	
Min. ID		0.506"		0.510"		0.516"		0.550"		0.569"		0.613"		0.624"		0.613"	
Nom. Wall		0.035"		0.048"		0.050"		0.043"		0.054"		0.035"		0.042"		0.045"	
Flow		Velocity	Loss	Velocity	Loss	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	FPS	Psi	FPS	Psi
0.5	30	0.80	0.37	0.79	0.35	0.77	0.34	0.68	0.25	0.63	0.21	0.54	0.14	0.52	0.13	0.54	0.14
1.0	60	1.60	1.33	1.57	1.28	1.53	1.21	1.35	0.89	1.26	0.75	1.09	0.52	1.05	0.48	1.09	0.52
1.5	90	2.39	2.82	2.36	2.71	2.30	2.56	2.03	1.88	1.89	1.59	1.63	1.11	1.57	1.02	1.63	1.11
2.0	120	3.19	4.80	3.14	4.62	3.07	4.37	2.70	3.20	2.52	2.71	2.17	1.89	2.10	1.73	2.17	1.89
2.5	150	3.99	7.26	3.93	6.99	3.84	6.60	3.38	4.84	3.15	4.10	2.72	2.85	2.62	2.62	2.72	2.85
3.0	180	4.79	10.18	4.71	9.80	4.60	9.26	4.05	6.78	3.79	5.75	3.26	4.00	3.15	3.67	3.26	4.00
3.5	210	5.58	13.55	5.50	13.04	5.37	12.31	4.73	9.02	4.42	7.65	3.80	5.32	3.67	4.88	3.80	5.32
4.0	240	6.38	17.35	6.28	16.69	6.14	15.77	5.40	11.56	5.05	9.79	4.35	6.81	4.20	6.25	4.35	6.81
4.5	270	7.18	21.57	7.07	20.76	6.90	19.61	6.08	14.37	5.68	12.18	4.89	8.48	4.72	7.77	4.89	8.48
5.0	300	7.98	26.22	7.85	25.24	7.67	23.84	6.75	17.47	6.31	14.81	5.44	10.30	5.25	9.45	5.44	10.30
6.0	360	9.57	36.75	9.42	35.37	9.21	33.41	8.10	24.49	7.57	20.75	6.52	14.44	6.29	13.24	6.52	14.44
7.0	420	11.17	48.90	10.99	47.06	10.74	44.45	9.45	32.58	8.83	27.61	7.61	19.21	7.34	17.62	7.61	19.21
8.0	480			12.56	60.26	12.27	56.92	10.80	41.72	10.09	35.36	8.70	24.60	8.39	22.56	8.70	24.60
9.0	540			14.13	74.95	13.81	70.80	12.15	51.89	11.36	43.98	9.78	30.60	9.44	28.06	9.78	30.60
10.0	600							13.50	63.07	12.62	53.45	10.87	37.19	10.49	34.11	10.87	37.19
11.0	660									13.88	63.77	11.96	44.37	11.54	40.69	11.96	44.37
12.0	720									15.14	74.93			12.59	47.81	13.05	52.13

Losses in psi per 100 feet of hose (psi/100 ft) for hose sizes: 18 mm (.710") ID through 35 mm (1.365") ID

Part No.		EHD1845		EHD1847		EHD1850		EHD2052		EHD2057		EHD2662		EHD2667		EHD3580	
Nom. ID		0.713"		0.729"		0.723"		0.807"		0.807"		1.059"		1.059"		1.365"	
Min. ID		0.710"		0.726"		0.720"		0.804"		0.804"		1.056"		1.056"		1.360"	
Nom. Wall		0.045"		0.047"		0.050"		0.052"		0.057"		0.062"		0.067"		0.080"	
Flow		Velocity	Loss	Velocity	Loss	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	FPS	Psi	FPS	Psi
1	60	0.81	0.26	0.78	0.23	0.79	0.24	0.63	0.14	0.63	0.14	0.37	0.04	0.37	0.04	0.22	0.01
2	120	1.62	0.92	1.55	0.83	1.58	0.86	1.26	0.50	1.26	0.50	0.73	0.13	0.73	0.13	0.44	0.04
3	180	2.43	1.96	2.33	1.75	2.36	1.83	1.90	1.07	1.90	1.07	1.10	0.28	1.10	0.28	0.66	0.08
4	240	3.24	3.33	3.10	2.99	3.15	3.11	2.53	1.82	2.53	1.82	1.47	0.48	1.47	0.48	0.88	0.14
5	300	4.05	5.04	3.88	4.52	3.94	4.71	3.16	2.75	3.16	2.75	1.83	0.73	1.83	0.73	1.10	0.21
6	360	4.86	7.06	4.65	6.34	4.73	6.60	3.79	3.85	3.79	3.85	2.20	1.02	2.20	1.02	1.33	0.30
7	420	5.67	9.39	5.43	8.43	5.52	8.78	4.42	5.13	4.42	5.13	2.56	1.36	2.56	1.36	1.55	0.40
8	480	6.48	12.03	6.20	10.79	6.30	11.24	5.06	6.57	5.06	6.57	2.93	1.74	2.93	1.74	1.77	0.51
9	540	7.29	14.96	6.98	13.42	7.09	13.98	5.69	8.17	5.69	8.17	3.30	2.16	3.30	2.16	1.99	0.63
10	600	8.10	18.19	7.75	16.32	7.88	16.99	6.32	9.93	6.32	9.93	3.66	2.63	3.66	2.63	2.21	0.77
11	660	8.91	21.70	8.53	19.47	8.67	20.27	6.95	11.84	6.95	11.84	4.03	3.14	4.03	3.14	2.43	0.92
12	720	9.72	25.49	9.30	22.87	9.46	23.81	7.58	13.91	7.58	13.91	4.40	3.69	4.40	3.69	2.65	1.08
13	780	10.53	29.56	10.08	26.52	10.24	27.62	8.22	16.14	8.22	16.14	4.76	4.28	4.76	4.28	2.87	1.25
14	840	11.59	35.31	11.09	31.68	11.27	32.98	9.04	19.27	9.04	19.27	5.24	5.11	5.24	5.11	3.16	1.49
15	900	12.43	40.17	11.89	36.04	12.09	37.53	9.69	21.93	9.69	21.93	5.62	5.81	5.62	5.81	3.39	1.70
16	960	13.27	45.33	12.69	40.66	12.90	42.34	10.35	24.74	10.35	24.74	6.00	6.56	6.00	6.56	3.62	1.91
17	1,020	14.11	50.76	13.49	45.54	13.72	47.42	11.00	27.71	11.00	27.71	6.38	7.34	6.38	7.34	3.84	2.14
18	1,080			13.95	48.46	14.18	50.46	11.38	29.48	11.38	29.48	6.59	7.81	6.59	7.81	3.98	2.28
19	1,140			14.73	53.56	14.97	55.77	12.01	32.59	12.01	32.59	6.96	8.64	6.96	8.64	4.20	2.52
20	1,200							12.64	35.83	12.64	35.83	7.33	9.50	7.33	9.50	4.42	2.77
22	1,320							13.90	42.75	13.90	42.75	8.06	11.33	8.06	11.33	4.86	3.31
24	1,440							15.17	50.23	15.17	50.23	8.79	13.31	8.79	13.31	5.30	3.88
26	1,560							16.43	58.25	16.43	58.25	9.52	15.44	9.52	15.44	5.74	4.50
28	1,680							17.69	66.82	17.69	66.82	10.26	17.71	10.26	17.71	6.18	5.17
30	1,800							18.96	75.93	18.96	75.93	10.99	20.13	10.99	20.13	6.63	5.87
32	1,920									20.22	85.57	11.72	22.68	11.72	22.68	7.07	6.62
34	2,040											12.45	25.38	12.45	25.38	7.51	7.40
36	2,160											13.19	28.21	13.19	28.21	7.95	8.23
38	2,280											13.92	31.18	13.92	31.18	8.39	9.10
40	2,400											14.65	34.29	14.65	34.29	8.83	10.00
45	2,700											16.48	42.65	16.48	42.65	9.94	12.44
50	3,000											18.32	51.84	18.32	51.84	11.04	15.12
55	3,300											20.15	61.84	20.15	61.84	12.15	18.04
60	3,600											21.98	72.66	21.98	72.66	13.25	21.19
65	3,900													23.81	84.27	14.36	24.58
70	4,200															15.46	28.19
75	4,500															16.56	32.04
80	4,800															17.67	36.11
85	5,100															18.77	40.40
90	5,400															19.88	44.91
95	5,700															20.98	49.64

Friction losses are calculated using Hazen-Williams equation (C = 140) and minimum inside diameters.
Shaded areas indicate velocities of over 5 fps

Friction Loss Charts for ID Controlled 42 psi Oval Hose

Losses in psi per 100 feet of hose (psi/100 ft) for hose sizes: 14 mm (0.555") ID through 52 mm (2.052") ID

Part No.		ELD1440		ELD1634		ELD2043		ELD2654		ELD3570		ELD4084		ELD52108	
Nom. ID		0.555"		0.633"		0.813"		1.043"		1.365"		1.595"		2.052"	
Min. ID		0.550"		0.630"		0.810"		1.040"		1.360"		1.590"		2.047"	
Nom. Wall		0.040"		0.034"		0.043"		0.054"		0.070"		0.084"		0.108"	
Flow		Velocity	Loss	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	FPS	Psi
1	60	1.35	0.89	1.03	0.46	0.62	0.13	0.38	0.04	0.16	0.01	0.16	0.01	0.10	0.00
2	120	2.70	3.20	2.06	1.65	1.25	0.49	0.76	0.14	0.32	0.02	0.32	0.02	0.19	0.01
3	180	4.05	6.78	3.09	3.50	1.87	1.03	1.13	0.30	0.48	0.04	0.48	0.04	0.29	0.01
4	240	5.40	11.56	4.12	5.96	2.49	1.75	1.51	0.52	0.65	0.07	0.65	0.07	0.39	0.02
5	300	6.75	17.47	5.15	9.02	3.11	2.65	1.89	0.79	0.81	0.10	0.81	0.10	0.49	0.03
6	360	8.10	24.49	6.18	12.64	3.74	3.72	2.27	1.10	0.97	0.14	0.97	0.14	0.58	0.04
7	420	9.45	32.58	7.20	16.82	4.36	4.95	2.64	1.46	1.13	0.19	1.13	0.19	0.68	0.05
8	480	10.80	41.72	8.23	21.53	4.98	6.33	3.02	1.87	1.29	0.24	1.29	0.24	0.78	0.07
9	540	12.15	51.89	9.26	26.78	5.60	7.88	3.40	2.33	1.45	0.30	1.45	0.30	0.88	0.09
10	600	13.50	63.07	10.29	32.55	6.23	9.57	3.78	2.83	1.62	0.36	1.62	0.36	0.97	0.10
11	660			11.32	38.84	6.85	11.42	4.15	3.38	1.78	0.43	1.78	0.43	1.07	0.12
12	720			12.35	45.63	7.47	13.42	4.53	3.97	1.94	0.50	1.94	0.50	1.17	0.15
13	780			13.38	52.92	8.09	15.56	4.91	4.61	2.10	0.58	2.10	0.58	1.27	0.17
14	840					8.72	17.85	5.29	5.29	2.26	0.67	2.26	0.67	1.36	0.20
15	900					9.34	20.29	5.67	6.01	2.42	0.76	2.42	0.76	1.46	0.22
16	960					9.96	22.86	6.04	6.77	2.59	0.86	2.59	0.86	1.56	0.25
17	1,020					10.58	25.58	6.42	7.57	2.75	0.96	2.75	0.96	1.66	0.28
18	1,080					11.21	28.43	6.80	8.42	2.91	1.06	2.91	1.06	1.75	0.31
19	1,140					11.83	31.43	7.18	9.30	3.07	1.18	3.07	1.18	1.85	0.34
20	1,200					12.45	34.56	7.55	10.23	4.42	2.77	3.23	1.29	1.95	0.38
22	1,320					13.70	41.23	8.31	12.21	4.86	3.31	3.55	1.54	2.14	0.45
24	1,440							9.06	14.34	5.30	3.88	3.88	1.81	2.34	0.53
26	1,560							9.82	16.63	5.74	4.50	4.20	2.10	2.53	0.61
28	1,680							10.58	19.08	6.18	5.17	4.52	2.41	2.73	0.71
30	1,800							11.33	21.68	6.63	5.87	4.85	2.74	2.92	0.80
32	1,920							12.09	24.43	7.07	6.62	5.17	3.09	3.12	0.90
34	2,040							12.84	27.34	7.51	7.40	5.49	3.46	3.31	1.01
36	2,160							13.60	30.39	7.95	8.23	5.82	3.84	3.51	1.12
38	2,280							14.35	33.59	8.39	9.10	6.14	4.25	3.70	1.24
40	2,400							15.11	36.94	8.83	10.00	6.46	4.67	3.90	1.37
45	2,700							17.00	45.94	9.94	12.44	7.27	5.81	4.39	1.70
50	3,000									11.04	15.12	8.08	7.06	4.87	2.06
55	3,300									12.15	18.04	8.89	8.43	5.36	2.46
60	3,600									13.25	21.19	9.70	9.90	5.85	2.89
65	3,900									14.36	24.58	10.50	11.48	6.34	3.36
70	4,200									15.46	28.19	11.31	13.17	6.82	3.85
75	4,500									16.56	32.04	12.12	14.97	7.31	4.37
80	4,800									17.67	36.11	12.93	16.87	7.80	4.93
85	5,100									18.77	40.40	13.73	18.87	8.29	5.51
90	5,400									19.88	44.91	14.54	20.98	8.77	6.13
95	5,700											15.35	23.19	9.26	6.78
100	6,000											16.16	25.50	9.75	7.45
125	7,500											20.20	38.55	12.19	11.26
150	9,000													14.62	15.79
175	10,500													17.06	21.01
200	12,000													19.50	26.90
225	13,500													21.94	33.46
250	15,000													24.37	40.67

Friction losses are calculated using Hazen-Williams equation (C = 140) and minimum inside diameters.
Shaded areas indicate velocities of over 5 fps

Friction Loss Charts

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
350	21,000									15.49	11.09	8.98	2.94
400	24,000									17.70	14.20	10.26	3.76
450	27,000									19.92	17.66	11.54	4.68
500	30,000									22.13	21.46	12.82	5.68
600	36,000											15.39	7.97
700	42,000											17.95	10.60
800	48,000											20.52	13.57
900	54,000											23.08	16.88
1,000	60,000											25.65	20.52
1,200	72,000												
1,300	78,000												
1,400	84,000												
1,500	90,000												
1,600	96,000												
1,700	102,000												
1,800	108,000												
1,900	114,000												
2,000	120,000												
2,100	126,000												
2,200	132,000												
2,300	138,000												
2,400	144,000												
2,500	150,000												

Friction losses are calculated using Hazen-Williams equation (C = 140) and minimum inside diameters.
Shaded areas indicate velocities of over 5 fps

Friction Loss Charts for OD Controlled Hose

Losses in psi per 100 feet of hose (psi/100 ft). for hose sizes: 16 mm (.600") ID through 20 mm (.828") ID

Part No.		EHO1650		EHO2050		EHO2055	
Nom. ID		0.600"		0.833"		0.828"	
Min. ID		0.587"		0.820"		0.815"	
Nom. Wall		0.050"		0.050"		0.055"	
Flow		Velocity	Loss	Velocity	Loss	Velocity	Loss
GPM	GPH	FPS	Psi	FPS	Psi	FPS	Psi
0.5	30	0.59	0.18	0.30	0.04	0.30	0.04
1.0	60	1.19	0.65	0.61	0.13	0.61	0.13
1.5	90	1.78	1.37	0.91	0.27	0.91	0.27
2.0	120	2.37	2.33	1.22	0.46	1.22	0.46
2.5	150	2.96	3.52	1.52	0.69	1.52	0.69
3.0	180	3.56	4.94	1.82	0.97	1.82	0.97
3.5	210	4.15	6.57	2.13	1.29	2.13	1.29
4.0	240	4.74	8.42	2.43	1.65	2.43	1.65
4.5	270	5.33	10.47	2.73	2.06	2.73	2.06
5.0	300	5.93	12.72	3.04	2.50	3.04	2.50
6.0	360	7.11	17.83	3.65	3.50	3.65	3.50
7.0	420	8.30	23.73	4.25	4.66	4.25	4.66
8.0	480	9.48	30.38	4.86	5.97	4.86	5.97
9.0	540	10.67	37.79	5.47	7.42	5.47	7.42
10.0	600	11.86	45.93	6.08	9.02	6.08	9.02
11.0	660	13.04	54.80	6.68	10.76	6.68	10.76
12.0	720	14.23	64.38	7.29	12.64	7.29	12.64
13.0	780			7.90	14.66	7.90	14.66
14.0	840			8.51	16.82	8.51	16.82
15.0	900			9.11	19.11	9.11	19.11
16.0	960			9.72	21.53	9.72	21.53
17.0	1,020			10.33	24.09	10.33	24.09
18.0	1,080			10.94	26.78	10.94	26.78
19.0	1,140			11.54	29.60	11.54	29.60
20.0	1,200			12.15	32.55	12.15	32.55
22.0	1,320			13.37	38.84	13.37	38.84
24.0	1,440			14.58	45.63	14.58	45.63
26.0	1,560			15.80	52.92	15.80	52.92
28.0	1,680					17.01	60.71
30.0	1,800						
32.0	1,920						

Friction losses are calculated using Hazen-Williams equation (C = 140) and minimum inside diameters.
Shaded areas indicate velocities of over 5 fps

Common Formulas

Emission Device Flow Formula

$Q = C(H)^X$

Where Q = Flow Rate (gph)
H = Operating Pressure (psi)
C =Flow Coefficient
X = Flow Exponent

Experimental determination of X

$$X = \frac{\log (Q1/Q2)}{\log (H1/H2)}$$

Hazen-Williams Equation For Plastic pipe C =150:

$$H_f = 0.000977 \frac{Q^{1.852}}{D^{4.871}} L$$

Where H_f = Friction Loss (ft)
Q = Flow Rate (gpm)
D = Actual Pipe I.D. (in)
L = Pipe Length (ft)

The 35 percent rule: Single -Sized Laterals and Submains

For plastic submain pipes with over 15 outles, the friction loss will be approximately 35% of the friction loss in a closed pipe of the same length and inlet flow.

Spaghetti Tubing Friction Loss Equation

$H_f = K*(Q^{1.75}/D^{4.77})$

Q = Flow Rate (gpm)
D = Tubing I.D. (in)
K = 4.37x10-7 = 0.000000437
L = Pipe Lenght (ft)
H_f = Friction loss, psi per foot of length

Velocity of Flow Equation

$V = 0.4085\ Q/D^2$
Where V = Velocity (ft. per second)
Q = Flow Rate (gpm)
D = Actual Pipe I.D. (inches)

Emission Uniformity

$EU = (1\text{-}1.27Cv/\sqrt{n})\ (Qm/Qa)$

Where EU = Emission Uniformity, expressed as a decimal.

n = For a point-source emitter on a permanent crop, the number of emitters per plant. For a line source on an annual crop, either the spacing between plants divided by the same unit length of lateral line to calculate Cv, or 1,whichever is greater.

Cv = The manufacrure's coefficient of variation for line source emitters, expressed as a decimal.

Qm = The minimum emitter flow rate fr the minimum pressure Hm in the system in gph.

Qa = The average, or design, emitter flow rate for the average or design pressure Ha in gph.

The EU Equation may be rewritten in terms of pressure variation instead of flow variation:

$EU = (1\text{-}1.27Cv/\sqrt{n})(Hm/Ha)^X$
Where:
Hm = Minimum system pressure, psi
Ha = Average system pressure, psi

The EU Equation may also be rewritten to solve for the system pressure variation, Hm/Ha:

$$\left(Hm/Ha\right) = \left[\frac{EU}{(1\text{-}1.27Cv/\sqrt{n})}\right]^{(1/x)}$$

Warranty

Toro Micro-Irrigation and its affiliate, Toro Warranty Company pursuant to an agreement between them, jointly warrant to Toro Micro-Irrigation trade customers that Toro Micro-Irrigation products for agricultural use will be free from original defects in materials and workmanship.

Toro Micro-Irrigation Price list is F.O.B. Factory. Neither Toro Micro-Irrigation nor Toro Warranty Company is liable for loss or damage occurring during shipment. Responsibility for safe delivery is assumed by the customer and freight carrier at the time of shipment. Claims for such damages should be filed with the freight carrier immediately upon identification.

Claims for defects that are not freight related should be filed with Toro Micro-Irrigation no later than five days from date of discovery of defect within the warranty period as stated below. In order to accurately identify the cause of potential warranty defects, the customer shall provide access to the field, system components, design information, maintenance records, and injected compounds (fertilizers, chemicals, etc.) as requested by Toro.

Toro Micro-Irrigation warranty only covers the Toro product itself, and only applies to defects in material or workmanship in that Toro product; warranty does not cover loss or damage to anything else, or loss or damage to the Toro product caused by anything other than a defect in that Toro product. For example and not by way of limitation, this warranty does not apply to loss or damage to the product, vegetation or other property or personal injury due to improper installation and or application (including non-standard use of product as for example mechanically moved irrigation systems, continuous pressure situations, heated water, waste water, potable water or others), abuse, alteration, mishandling, accident, insects, rodents, mechanical damage, plugging, over pressurization or if the product damage results from service by anyone other than Toro Micro-Irrigation or its authorized service centers or used outside the recommendations of the Toro Micro-Irrigation Owner's Manual.

Many plastic compounds are widely known to be susceptible to environmental stress cracking (ESC) and other forms of material degradation. The use of certain substances may accelerate the process of ESC and/or material degradation, and would invalidate any Toro product warranty.

Neither Toro Micro-Irrigation nor Toro Warranty Company is liable for failure of products not manufactured by Toro Micro-Irrigation even though such products may be sold or used in conjunction with Toro Micro-Irrigation products.

Neither Toro Micro-Irrigation nor Toro Warranty Company is liable for indirect, incidental, or consequential damages, including but not limited to vegetation or crop loss during periods of malfunction or resulting non-use.

Neither Toro Micro-Irrigation nor Toro Warranty Company is liable for any loss or damage, including property damage resulting from installer's negligence.

This warranty is the only warranty made by Toro Micro-Irrigation or Toro Warranty Company. It replaces all other express warranties and all implied warranties are disclaimed, including the implied warranties of merchantability and fitness for use.

Under this warranty, the sole remedy is to direct all claims to an authorized Toro Micro-Irrigation dealer.

Within the warranty period stated below, Toro Micro-Irrigation and Toro Warranty Company agree to repair or replace, at their option and without charge, any parts which are found to have original manufacturing defects, provided the product is returned freight pre-paid. If the warranty period is longer than two years and products are replaced under the warranty after the second year, the remaining warranty will be prorated for the remaining warranty period, equal to the ratio between the period that has passed prior to replacement and the full warranty period. Toro Micro-Irrigation and Toro Warranty Company do not warranty any labor, including but not limited to labor on installation or removal.

This warranty gives you specific legal rights and you may have other rights, which vary from state to state.

Warranty Period from date of delivery:

Aqua-Traxx® Drip Tape:
- 4, 5 & 6 mil ..... 6 months
- 8 mil ..... 9 months
- 10, 12, 13 & 15 mil ..... 18 months

Neptune:
- 10, 13 & 15 mil ..... 18 months

BlueLine™ Dripline:
- Emitters ..... 2 years
- Hose ..... 5 years

Drip In® Dripline:
- Emitters ..... 2 years
- Hose ..... 5 years
- with Rootguard ..... 10 years**

Blue Stripe® Hose:
- Oval 42 psi ..... 7 years
- Oval 21 psi ..... 2 years
- Micro-Distribution ..... 7 years
- Round ..... 7 years

All Other Hose: ..... 1 year*

Fittings:
- All ..... 1 year*

Emission Devices:
- All (except NGE®) ..... 1 year
- NGE® Emitter ..... 2 years

Controllers:
- All ..... 5 years

Valves:
- 100, 600, 700 Series ..... 5 years
- Bermad® Valves ..... 1 year*
- Air Vents ..... 1 year*

Mazzei Injectors:
- Airjection® ..... 1 year*
- Chemical Injectors ..... 1 year*

Filters and components:
- All ..... 1 year*

All Other Products ..... 1 year*

* Products sold by, but not manufactured by Toro Micro-Irrigation are warranted by their respective manufacturers
** Pro-rated warranty for root intrusion by Geoflow Inc.

Brand Usage

Company Logo

The Toro logo is a company identifier and needs be used as set forth in the guidelines below. The guidelines for usage are required whenever the logo is used in any format.

1. Our brand name is Toro. It is expressed graphically as our logo with or without the words "Count on it.", as seen below:

2. The color used to create the Toro logo is PMS 186. Process Equivalent: C=0%, M=100%, Y=80%, K=5%
3. There is no single approved size for the Toro logo. The logo may be reduced or enlarged as required; however, it must remain in proportion with the camera-ready artwork provided, and should not be reproduced smaller than 1/4 inch (6 mm) in width, as measured from the left edge to the right edge of the shield. All logos are available in electronic format from the Marketing Department. **Please do not try and re-create a logo.**
4. In print applications, please ensure that the logo has good contrast with the background. When the logo is to be printed on a colored background, always choose a color that will give the logo maximum visibility and readability.
5. In advertising applications, please give the company logo plenty of staging area or enough white space so it does not appear crowded by other marketing elements.
6. Dealer names can appear with the Toro logo in its preferred font and color, however the font size cannot exceed the height of the "T" in the Toro logo, and the dealer name must be at least 1/2" below the Toro logo/product name. The dealer name cannot be above or to the side of the Toro logo.

Product Names

Use of Aqua-Traxx®, Drip In® and other Toro product names:

There are many Micro-Irrigation products under the Toro brand. Should you need to identify these products in any advertising, promotional or printed format, please use the font format as you see below:

Aqua-Traxx®

Drip In®

This font is Stone Sans bold and is the font used to identify all Toro products when they are used in promotional or printed format. Please call the Marketing Department should you have any questions.

Trademark Usage

Toro is a registered trademark and should be used in compliance to protect the trademark.

Correct Usage of the Registration (®) Symbol

- Use only when it refers to a Toro product.
- Use on the upper right shoulder of the mark in the first reference.

In addition, many Toro products and properties have a federally registered trademark (®) and must be referred to as follows:

Products with ®:
Aqua-Traxx®, NGE®, E-2®, Rain Dial®, Total Control®, MC Plus®, IBOC® Plus, Blue Stripe®, Snap-Jet®, Drip In®, Classic®, ROOTGUARD®, Dura-Traxx®, Clipperline®, KwikDial®, Mine-Traxx®, Xpando®, OmniReg®

Use (™) on the right shoulder (e.g. Loc-Eze™) with the following un-registered trademarks:

Aqua-Clear™, BlueLine™, Junior™, Junior DC™, Loc-Eze™, PC™, Pro-Loc™, Sentinel™

QUESTIONS:
If you have any questions regarding logo guidelines or trademarks, please contact the Marketing Department at +1 (619) 596-4211.

Notes

Notes

A CENTURY OF INNOVATION

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TORO®

Count on it.