LANDSCAPE & TURF PRODUCT CATALOG

DRIP IRRIGATION AND WATER CONSERVATION PRODUCTS

NETAFIM™

January 1, 2016

Schumacher IRRIGATION

Your Irrigation Superstore
Email: irrigate@schumacherirrigation.com
www.schumacherirrigation.com

Toll Free: 800-246-3685
Phone: 402-246-3685
Fax: 402-246-2072

ABOUT NETAFIM

FROM PIONEERING DRIP IRRIGATION FOR AGRICULTURE, TO INNOVATIVE WATER CONSERVING SOLUTIONS IN LANDSCAPE IRRIGATION

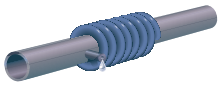
First founded by farmers and agronomists in 1965, who recognized drip irrigation as a solution to one of the world's most urgent problems - lack of quality water for food production - Netafim has grown today to become the recognized global leader in the development of low-volume, drip irrigation solutions for a diverse range of applications.

As a pioneer in developing water-conserving irrigation technologies for the world's agriculture community, Netafim continues to leverage its five decades of innovation to provide today's landscape professionals with comprehensive solutions for efficient and effective irrigation even in the most challenging residential and commercial landscapes. A complete line of technologically advanced, environmentally sound, drip irrigation and water conservation products deliver water savings, low maintenance and worry-free operation.

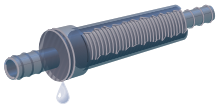
Recognizing the evolving needs of a diverse and dynamic landscape industry, Netafim addresses the challenges of modern landscapes through innovative products, education, training and research. Together, we can create sustainable landscapes and grow more with less.

NETAFIM'S ADVANCEMENTS IN EMITTER TECHNOLOGY

1960 Blass Invention: Coiled Dripper

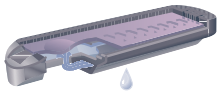


1966 Laminar Dripper: Capillary Tube

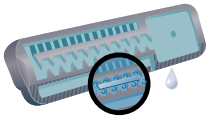


1971 Turbulent Dripper: Toothed Labyrinth

1979 Pressure Compensating (PC) Technology: Self-Cleaning



1998 TurboNet Technology: Increased Flow Path Velocity, No Plugging



2000 Maximum Uniformity: CNL, Root Barrier and Anti-Siphon

TECHLINE CV EMITTER (CNL)
TECHLINE RW/RWP EMITTER (NON-CNL)

2003 Maximum Uniformity on Slopes: Anti-Siphon, Self-Cleaning

TECHLINE DL AND EZ EMITTER

2016 Best Root Intrusion Protection: High Check Valve, Copper Oxide and Anti-Siphon

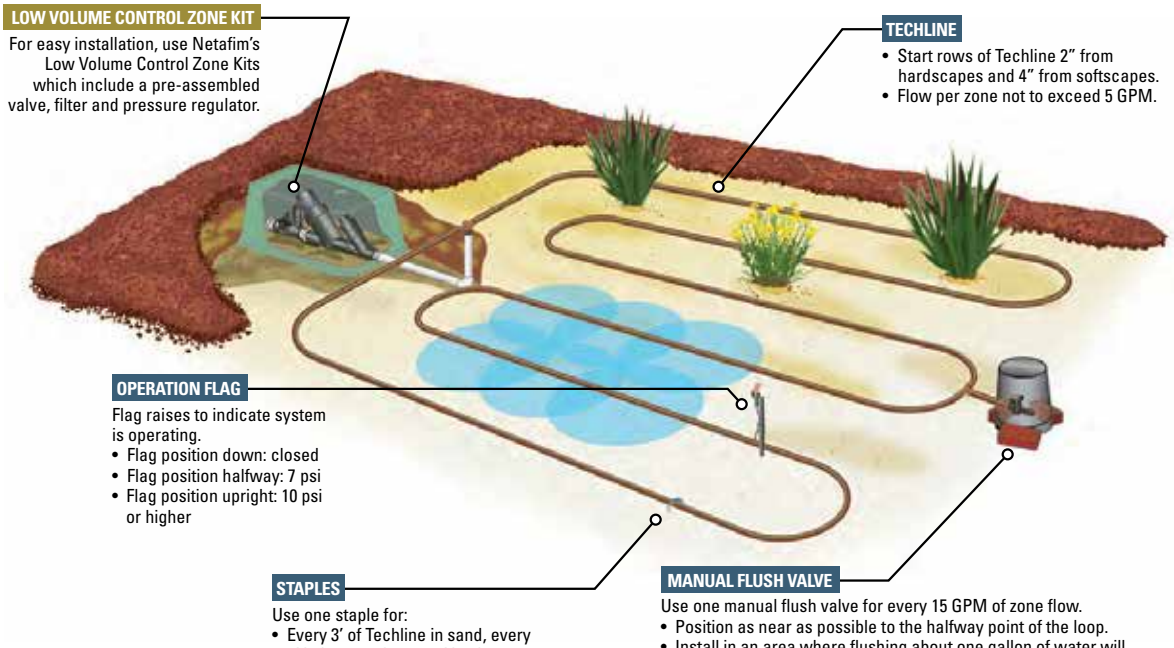
TECHLINE HCVXR EMITTER

TABLE OF CONTENTS

TYPICAL DESIGN LAYOUTS

SURFACE DESIGN LAYOUT

For use with Techline® dripline on-surface designs (on top of soil, covered with mulch).



LOW VOLUME CONTROL ZONE KIT

For easy installation, use Netafim's Low Volume Control Zone Kits which include a pre-assembled valve, filter and pressure regulator.

TECHLINE

- Start rows of Techline 2" from hardscapes and 4" from softscapes.
- Flow per zone not to exceed 5 GPM.

OPERATION FLAG

Flag raises to indicate system is operating.

- Flag position down: closed
- Flag position halfway: 7 psi
- Flag position upright: 10 psi or higher

STAPLES

Use one staple for:

- Every 3' of Techline in sand, every 4' in loam and every 5' in clay.
- Use two staples over each tee, elbow or cross.
- Recommend use of a U-shaped staple that is less likely to pinch the dripline.

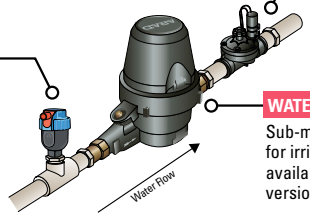
MANUAL FLUSH VALVE

Use one manual flush valve for every 15 GPM of zone flow.

- Position as near as possible to the halfway point of the loop.
- Install in an area where flushing about one gallon of water will not cause flooding.

For Techline HCVXR, CV and EZ, use a manual flush valve.
For Techline DL and RW, use an automatic flush valve and an air/vacuum relief air vent (see pages 27 and 26).

OPTIONAL COMPONENTS



MASTER VALVE

CONTINUOUS ACTING AIR VENT

Place before water meter. Automatic continuous acting mini air vent models available in ½" and ¾" sizes, up to 150 psi.

WATER METER

Sub-meter used to measure water usage for irrigation system. Plastic version available in ¾" and 1" sizes. Metal version available in ¾" to 6" sizes.

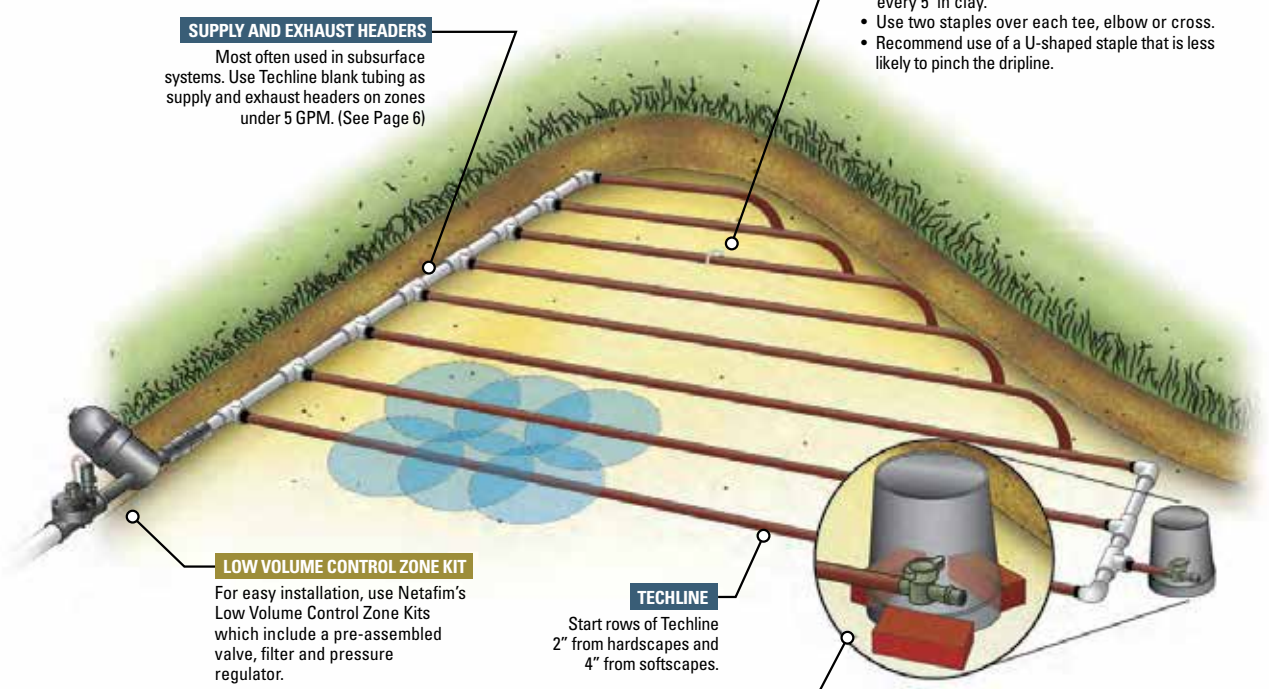
TYPICAL DESIGN LAYOUTS

SUBSURFACE/SURFACE DESIGN LAYOUT

For use with Techline® dripline designs.
Bury driplines evenly throughout the zone from 4" to 6" deep or on-surface under mulch.

SUPPLY AND EXHAUST HEADERS
Most often used in subsurface systems. Use Techline blank tubing as supply and exhaust headers on zones under 5 GPM. (See Page 6)

STAPLES
Use one staple for:
- Every 3' of Techline in sand, every 4' in loam and every 5' in clay.
- Use two staples over each tee, elbow or cross.
- Recommend use of a U-shaped staple that is less likely to pinch the dripline.



LOW VOLUME CONTROL ZONE KIT
For easy installation, use Netafim's Low Volume Control Zone Kits which include a pre-assembled valve, filter and pressure regulator.

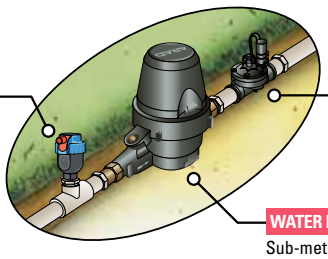
TECHLINE
Start rows of Techline 2" from hardscapes and 4" from softscapes.

MANUAL FLUSH VALVE
- Normally placed along exhaust header or at the point farthest away from the source.
- Install in a valve box with gravel sump.

NOTES:
- Add automatic flush valve when using Techline DL or RW.
- Add air relief valve at the highest point in the system when using Techline DL or RW.

OPTIONAL COMPONENTS

CONTINUOUS ACTING AIR VENT
Place before water meter. Automatic continuous acting mini air vent models available in ½" and ¾" sizes, up to 150 psi.



MASTER VALVE

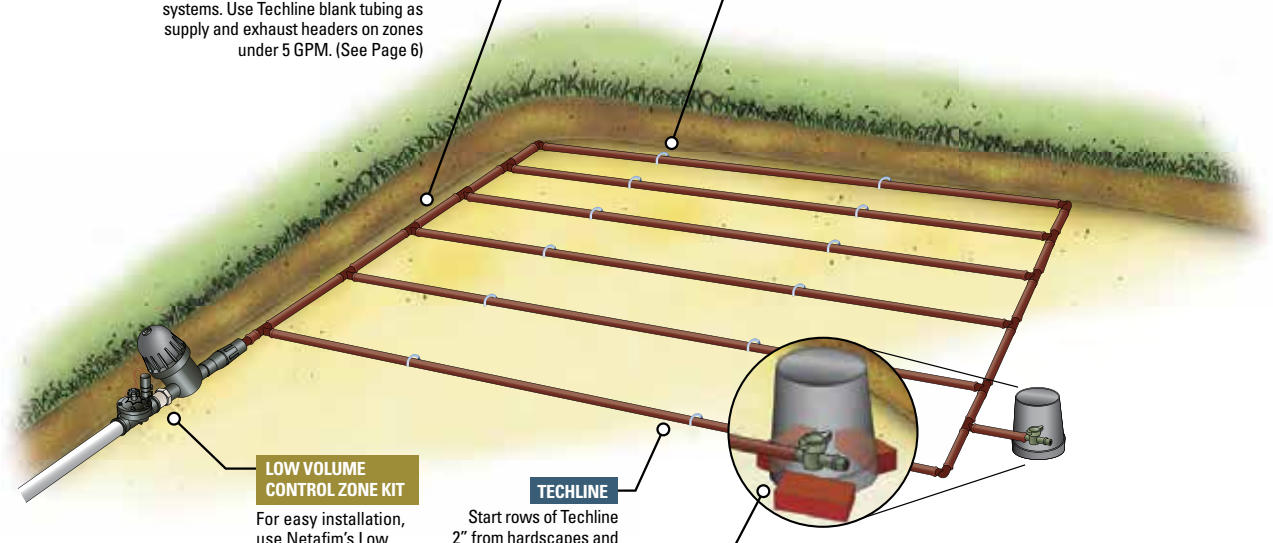
WATER METER
Sub-meter used to measure water usage for irrigation system. Plastic version available in ¾" and 1" sizes. Metal version available in ¾" to 6" sizes.

Schumacher IRRIGATION
Your Irrigation Superstore
Email: irrigate@schumacherirrigation.com
www.schumacherirrigation.com
Toll Free: 800-246-3685
Phone: 402-246-3685
Fax: 402-246-2072

TYPICAL DESIGN LAYOUTS

SUBSURFACE/SURFACE DESIGN LAYOUT

For use with Techline® dripline designs.
Bury driplines evenly throughout the zone from 4" to 6" deep or on-surface under mulch.



STAPLES

Use one staple for:
- Every 3' of Techline in sand, every 4' in loam and every 5' in clay.
- Use two staples over each tee, elbow or cross.
- Recommend use of a U-shaped staple that is less likely to pinch the dripline.

SUPPLY AND EXHAUST HEADERS

Most often used in subsurface systems. Use Techline blank tubing as supply and exhaust headers on zones under 5 GPM. (See Page 6)

LOW VOLUME CONTROL ZONE KIT

For easy installation, use Netafim's Low Volume Control Zone Kits which include a pre-assembled valve, filter and pressure regulator.

TECHLINE

Start rows of Techline 2" from hardscapes and 4" from softscapes.

MANUAL FLUSH VALVE

- Normally placed along exhaust header or at the point farthest away from the source.
- Install in a valve box with gravel sump.

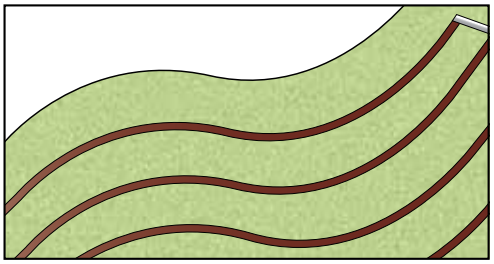
NOTES:
- Add automatic flush valve when using Techline DL or RW.
- Add air relief valve at the highest point in the system when using Techline DL or RW.

Netafim offers comprehensive design details, installation information and a dripline calculator on our website, www.netafimusa.com

TYPICAL DESIGN LAYOUTS

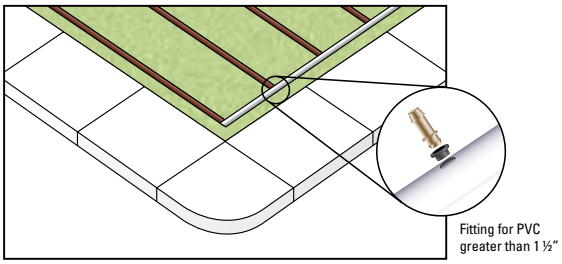
CONTOURS

Driplines provide a flexible solution for irrigating around contoured areas and around confined planters or shrubs.



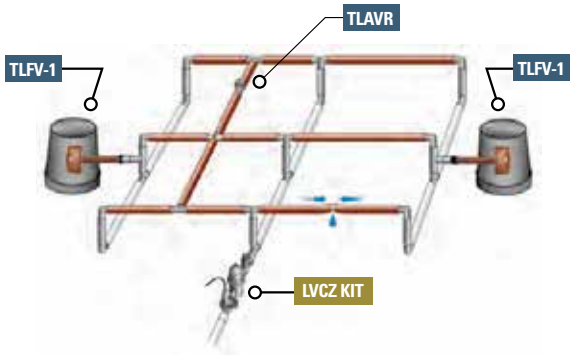
LATERAL PLACEMENT

Place laterals 2" from any hardscape or 4" from the outside of uncontained landscapes. Place laterals perpendicular to (across) slopes, if any.



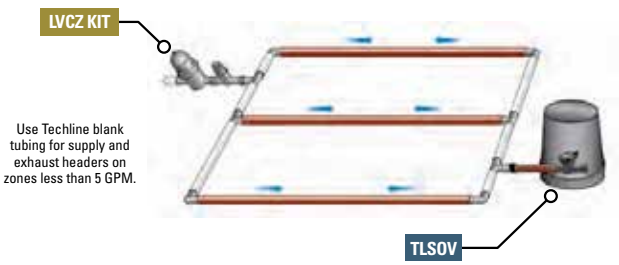
CENTER FEED

For Techline® DL or RW system applications in medians or island use center feed configuration for long narrow areas.



END FEED

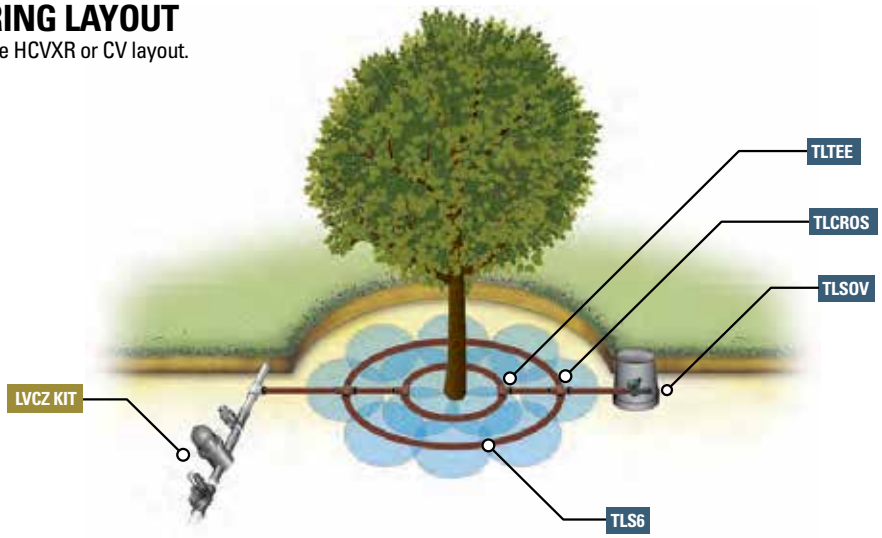
For Techline HCVXR or CV layouts. End feed configurations are generally used for short or medium length installations.



TYPICAL DESIGN LAYOUTS

TREE RING LAYOUT

For Techline HCVXR or CV layout.



SIZING OF HEADERS

SUPPLY AND EXHAUST HEADERS

PROPER SIZING OF SUPPLY AND EXHAUST HEADERS (17MM TECHLINE DRIPLINES)

TOTAL ZONE FLOW	PIPE SIZE
UP TO 5 GPM	17mm TECHLINE TUBING OR ½" SCH 40 PVC OR ½" POLY TUBING
5.1 TO 8 GPM	¾" SCH 40 PVC OR ¾" POLY TUBING
8.1 TO 13 GPM	1" SCH 40 PVC OR 1" POLY TUBING
13.1 TO 22 GPM	1 ¼" SCH 40 PVC OR 1 ¼" POLY TUBING
22.1 TO 31 GPM	1 ½" SCH 40 PVC OR 1 ½" POLY TUBING

TOTAL ZONE FLOW	PIPE SIZE
UP TO 6 GPM	½" CLASS 315 PVC
6.1 TO 10 GPM	¾" CLASS 200 PVC
10.1 TO 17 GPM	1" CLASS 200 PVC
17.1 TO 27 GPM	1 ¼" CLASS 200 PVC
27.1 TO 35 GPM	1 ½" CLASS 200 PVC

5 feet per second velocity

NOTE: A 45 psi pressure regulator is recommended to obtain maximum run lengths and maximum zone size when installing 17mm Techline driplines.

SOIL TYPES AND SLOPES

DETERMINING THE PROPER EMITTER TO USE IS BASED PRIMARILY ON THE SOIL TYPE AND SLOPE

MAXIMUM PRECIPITATION RATES (INCHES PER HOUR)

		0% TO 5% SLOPE		5% TO 8% SLOPE		8% TO 12% SLOPE		12% TO 20% SLOPE	
		COVERED	BARE	COVERED	BARE	COVERED	BARE	COVERED	BARE
SOIL TEXTURE	COARSE SANDY SOIL	2.00	2.00	2.00	1.50	1.50	1.00	1.00	1.00
	COARSE SANDY SOIL OVER COMPACT SUBSOIL	1.75	1.50	1.25	1.00	1.00	0.75	0.75	0.40
	LIGHT SANDY SOIL	1.75	1.00	1.25	0.80	1.00	0.60	0.75	0.40
	LIGHT SANDY SOIL OVER COMPACT SUBSOIL	1.25	0.75	1.00	0.50	0.75	0.40	0.50	0.30
	UNIFORM SILT LOAM	1.00	0.50	0.80	0.40	0.60	0.30	0.40	0.20
	SILT LOAM OVER COMPACT SUBSOIL	0.60	0.30	0.50	0.25	0.40	0.15	0.30	0.10
	HEAVY CLAY / CLAY LOAM	0.20	0.15	0.15	0.10	0.12	0.08	0.10	0.06

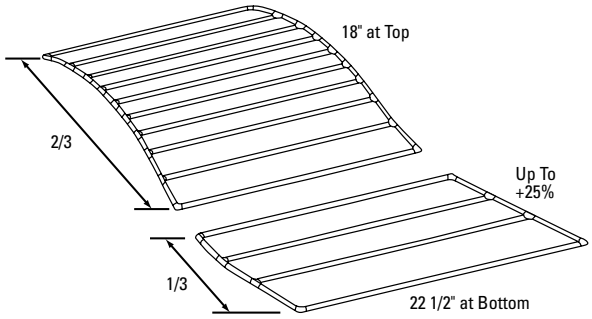
Note: The above average values are for reference purposes. Data may vary with respect to actual soil and site conditions. Data from USDA.

The Maximum Precipitation Rates Chart from the U.S. Department of Agriculture shows the ability of various soils to absorb water. This information is important because it is the best way to show how different soils manage water. In the case of Coarse Sandy Soil on a 0 to 5% Slope, it can absorb 2.00" of water if covered with vegetation. Conversely, a heavy clay/clay loam soil can only accept about 0.20". This means that sandy soil does not hold water as well as tighter soils. It also means that sandy soil will not radiate the water as far laterally and upward as a tighter soil. As such, care needs to be taken when deciding what emitter flow rate to use and how far apart the emitters can be from each other. And as the slope increases, this takes on even greater importance.

SLOPES AND BERMS

Techline® HCVXR and CV emitters have a built-in check valve. This allows Techline HCVXR to hold back up to a 8.5' and Techline CV up to 4.6' column of water. As such, designing Techline HCVXR and CV on slopes and berms is very easy.

- Techline HCVXR and CV should be installed perpendicular to (across) slopes.
- In the upper 2/3 of the slope, space Techline HCVXR and CV per General Guidelines tables, pages 11 and 14.
- In the lower 1/3 of the slope, increase the distance between rows by 25%.
- For every 4.6' elevation change, when using Techline CV either:
  - Split the slope into separate zones, or
  - Install a Netafim in-line check valve (TLCV050M1).
- For every 8.5' elevation change, when using Techline HCVXR either:
  - Split the slope into separate zones, or
  - Install a Netafim in-line check valve (TLCV050M1).

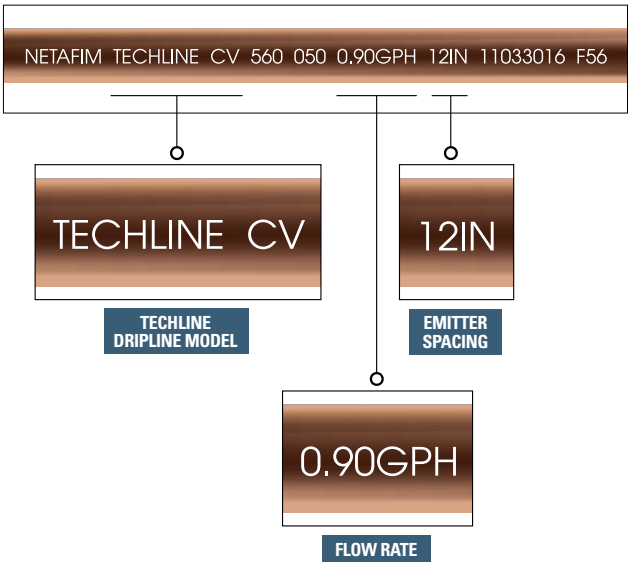


TECHLINE® IDENTIFIERS

TECHLINE® LASER ETCHING

Now there's a quick and easy way to identify the dripline model, flow rate and emitter spacing since the information is permanently etched into the surface of the dripline.

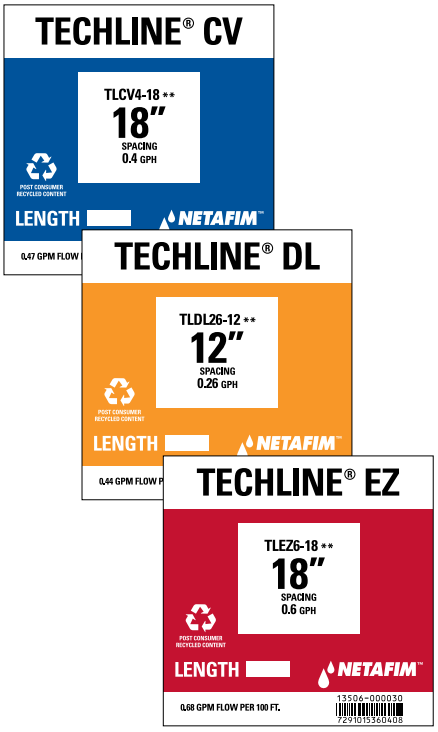
LASER ETCHING FOR EASY IDENTIFICATION



TECHLINE® COIL LABELS

To make product identification easy, each Netafim coil has a bright colored label which designates the flow rate. The rectangular shape and color coding makes coil identification easy, even from a distance.

COLOR	FLOW RATE
	0.26 GPH 0.33 GPH
	0.4 GPH 0.53 GPH
	0.6 GPH 0.77 GPH
	0.9 GPH 1.16 GPH



TECHLINE® DRIPLINE
COMPARISON

	TECHLINE HCVXR				TECHLINE CV				TECHLINE DL				TECHLINE RW & RWP				TECHLINE EZ			
	ROOT INTRUSION PROTECTION				MAXIMUM UNIFORMITY				MAXIMUM UNIFORMITY				RECYCLED/ RECLAIMED WATER				SMALL & MEDIUM AREAS			
	See Pages 10-12				See Pages 13-15				See Pages 16-17				See Pages 18-19				See Pages 20-21			
Emitter Flow Rate (GPH)	0.33	0.53	0.77	1.16	0.26	0.4	0.6	0.9	0.26	0.4	0.6	0.9	0.26	0.4	0.6	0.9	0.26	0.4	0.6	0.9
Tubing Color	Darker Brown				Dark Brown				Brown				Brown w/2 Purple Stripes & Purple				Dark Brown			
DIAMETER	17mm				17mm				17mm				17mm				12mm			
APPLICATION: TURF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SHRUB & GROUND COVER	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
INSTALLATION: SUBSURFACE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ON-SURFACE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AIR/VACUUM RELIEF VENT REQUIRED FOR SUBSURFACE?	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EMITTER SPACING: 6"	S.O.*				S.O.*				S.O.*				S.O.*				Yes	Yes	S.O.*	S.O.*
12"	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18"	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24"	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	S.O.*			
BUILT-IN CHECK VALVE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	S.O.*				No	No	No	No
ANTI-SIPHON EMITTER	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PRESSURE COMPENSATING	21.8 to 58 psi				14.5 to 58 psi				6 to 58 psi				6 to 58 psi				6 to 58 psi			
CONTINUOUS SELF-FLUSHING EMITTERS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MAXIMUM RECOMMENDED SYSTEM PRESSURE	58 psi				58 psi				58 psi				58 psi				58 psi			
MINIMUM PRESSURE REQUIRED	21.8 psi				14.5 psi				6 psi				6 psi				6 psi			
BENDING RADIUS	7"				7"				7"				7"				6"			
QUALIFIES FOR LEED CREDIT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
USE WITH RECLAIMED WATER	No				No				No				Yes				No			
MAXIMUM LENGTH OF SINGLE LATERAL (FEET) @ 45 PSI, 18" EMITTER SPACING	663	488	381	290	845	620	489	371	1019	750	591	450	1019	750	591	450	533	392	308	234
FLOW PER 100 FEET, 18" EMITTER SPACING (GPH)	22.0	35.3	51.3	77.3	17.6	28.2	40.5	61.6	17.6	28.2	40.5	61.6	17.6	28.2	40.5	61.6	17.6	28.2	40.5	61.6

*Note: Special Orders (S.O.) can be placed to accommodate custom spacing or other special considerations. Set-up charge, higher pricing and longer leadtimes may apply.

TECHLINE® HCVXR

Industry's Best Protection Against Root Intrusion

17mm DRIPLINE

APPLICATIONS

- Subsurface or on-surface applications
- Turf, shrubs, trees and flowers
- Sports turf, tennis courts, golf courses
- Slopes
- Curved, angular or narrow planting areas
- High traffic/high liability areas
- Areas subject to vandalism
- At-grade windows
- Green walls, green roofs
- Raised planters

SPECIFICATIONS

- Emitter flows: 0.33, 0.53, 0.77, 1.16 GPH
- Emitter spacings: 12", 18", 24" (24" spacing available in 1,000' only)
- Pressure compensation range: 21.8 to 58 psi
- High check valve: holds back 8.5' of water
- Bending radius: 7"
- Maximum recommended system pressure: 58 psi
- Minimum pressure required: 21.8 psi
- Tubing diameter: 0.66" OD; 0.56" ID, 0.050" wall
- Coil lengths: 100', 250', 500', 1,000'
- Recommended minimum filtration: 120 mesh
- Diaphragm: molded silicon
- ISO 9261 Standard Compliance

FEATURES & BENEFITS

LONG LASTING PROTECTION THROUGHOUT THE LIFE OF THE DRIPLINE

Cupron® copper oxide will not wash off, wear off and does not leach out of the emitter providing superior root intrusion resistance.

PATENTED EMITTER DESIGN WITH PHYSICAL ROOT BARRIER

Offset flow path, extra large bath area and raised outlet prevent root intrusion.

HIGH CHECK VALVE IN EACH EMITTER

The high check valve is great on slopes because it holds back 8.5' of water (elevation change) keeping the dripline charged for even distribution of water with no low emitter drainage.

EMITTER WITH ANTI-SIPHON FEATURE

Emitter outlet is sealed at system shutdown blocking debris from entering the dripline after irrigation.

PRESSURE COMPENSATING WITH CONTINUOUS SELF-FLUSHING

Delivers precise, equal amounts of water over wide pressure range while continuously flushing debris throughout operation.

NEW COLOR FOR EASY IDENTIFICATION

A new color provides easy identification as Techline HCVXR.

FOUR NEW EMITTER FLOW RATES

Achieve maximum design flexibility with four new emitter flow rates - the most options offered in the industry.

LASER ETCHING FOR EASY IDENTIFICATION

TECHLINE HCVXR MADE WITH POST CONSUMER RECYCLED MATERIAL

QUALIFIES FOR USE ON LEED PROJECTS

TECHLINE® HCVXR

Cupron® copper oxide (Cu_2O) technology effectively deters roots from growing in the HCVXR emitter. During the manufacturing process, the copper oxide is mixed with the emitter resin material infusing the copper oxide in the emitter. It will not wash off, wear off or leach out of the emitter. The copper colored top portion of the emitter contains the embedded copper oxide.

Top with embedded copper oxide

Diaphragm

Bottom with large filtration area

TECHLINE HCVXR-RW

Now available for reclaimed water use – Techline HCVXR dripline with a purple stripe, high check valve and root intrusion protection.

A LITTLE BIT MORE ABOUT CUPRON TECHNOLOGY

Cupron® technology remains effective throughout the life of the product.

- This technology was used in 2010 in the socks given to Chilean Miners on day 36 of being trapped underground. For the miners, these anti-odor socks prevented 99.9% of bacteria and fungi while improving the overall appearance of the skin.
- The Israeli Defense Force became the first army in the world to supply their troops with anti-microbial socks based on this innovative copper technology.

RELIABILITY WITH THE LANDSCAPE INDUSTRY'S LONGEST ROOT INTRUSION WARRANTY

15 YEARS

Netafim stands behind Techline HCVXR with an unprecedented limited warranty for root intrusion. We warrant Techline HCVXR to be free of emitter plugging due to root intrusion for a period of 15 years* from the date of original delivery.

* Refer to the Warranty Page for more details.

GENERAL GUIDELINES	TURF												SHRUB & GROUNDCOVER											
	CLAY SOIL			LOAM SOIL			SANDY SOIL			COARSE SOIL			CLAY SOIL			LOAM SOIL			SANDY SOIL			COARSE SOIL		
EMITTER FLOW	0.33 GPH			0.53 GPH			0.77 GPH			1.16 GPH			0.33 GPH			0.53 GPH			0.77 GPH			1.16 GPH		
EMITTER SPACING	18"			12"			12"			12"			18"			18"			12"			12"		
LATERAL (ROW) SPACING	18"	20"	22"	12"	18"	20"	12"	14"	16"	12"	14"	16"	18"	21"	24"	18"	21"	24"	16"	18"	20"	16"	18"	20"
BURIAL DEPTH	Bury evenly throughout the zone from 4"to 6"												On-surface or bury evenly throughout the zone to a maximum of 6"											
APPLICATION RATE (INCHES/HOUR)	0.24	0.21	0.19	0.85	0.56	0.51	1.23	1.05	0.92	1.86	1.60	1.40	0.24	0.20	0.18	0.38	0.32	0.28	0.92	0.82	0.74	1.40	1.24	1.12
TIME TO APPLY ¼" OF WATER (MINUTES)	64	71	78	18	27	30	12	14	16	8	9	11	64	74	85	40	46	53	16	18	20	11	12	13
Following these maximum spacing guidelines, emitter flow selection can be increased if desired by the designer. 1.16 GPH flow rate available for areas requiring higher infiltration rates, such as coarse sandy soils.																								

Schumacher IRRIGATION

Your Irrigation Superstore
Email: irrigate@schumacherirrigation.com
www.schumacherirrigation.com

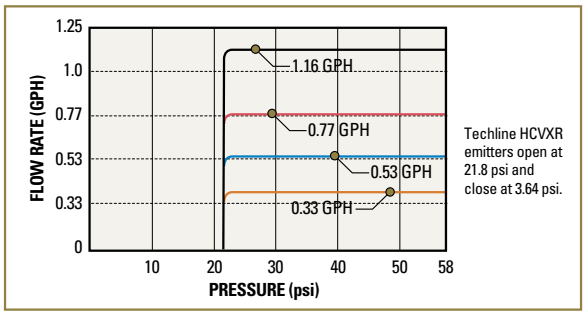
Toll Free: 800-246-3685
Phone: 402-246-3685
Fax: 402-246-2072

TECHLINE® HCVXR

FLOW PER 100 FEET

EMITTER SPACING	0.33 EMITTER		0.53 EMITTER		0.77 EMITTER		1.16 EMITTER	
	GPH	GPM	GPH	GPM	GPH	GPM	GPH	GPM
12″	33.0	0.55	53.0	0.88	77.0	1.28	116.0	1.93
18″	22.0	0.37	35.3	0.59	51.3	0.86	77.3	1.29
24″	16.5	0.28	26.5	0.44	38.5	0.64	58.0	0.97

FLOW RATE VS. PRESSURE



Techline HCVXR emitters open at 21.8 psi and close at 3.64 psi.

ORDERING INFORMATION

FLOW RATE	EMITTER SPACING	COIL LENGTH	MODEL NUMBER
0.33 GPH	12″	100′	TLHCVXR3-1201
		250′	TLCHVXR3-12025
		500′	TLCHVXR3-1205
		1,000′	TLHCVXR3-1210
	18″	100′	TLHCVXR3-1801
		250′	TLHCVXR3-18025
		500′	TLHCVXR3-1805
		1,000′	TLHCVXR3-1810
	24″	1,000′	TLHCVXR3-2410
0.53 GPH	12″	100′	TLHCVXR5-1201
		250′	TLHCVXR5-12025
		500′	TLHCVXR5-1205
		1,000′	TLHCVXR5-1210
	18″	100′	TLHCVXR5-1801
		250′	TLHCVXR5-18025
		500′	TLHCVXR5-1805
		1,000′	THLCVXR5-1810
	24″	1,000′	TLHCVXR5-2410
0.77 GPH	12″	100′	TLHCVXR7-1201
		250′	TLHCVXR7-12025
		500′	TLHCVXR7-1205
		1,000′	TLHCVXR7-1210
	18″	100′	TLHCVXR7-1801
		250′	TLHCVXR7-18025
		500′	TLHCVXR7-1805
		1,000′	TLHCVXR7-1810
	24″	1,000′	TLHCVXR7-2410
1.16 GPH	12″	100′	TLHCVXR11-1201
		250′	TLHCVXR11-12025
		1,000′	TLHCVXR11-1210
	18″	100′	TLHCVXR11-1801
		250′	TLHCVXR11-18025
		1,000′	TLHCVXR11-1810
	24″	1,000′	TLHCVXR11-2410
BLANK TUBING		100′	TLHCVXR001
		250′	TLHCVXR0025
		500′	TLHCVXR005
		1,000′	TLHCVXR010

MAXIMUM LENGTH OF A SINGLE LATERAL (FEET)

EMITTER SPACING		12″				18″				24″	
EMITTER FLOW (GPH)		0.33	0.53	0.77	1.16	0.33	0.53	0.77	1.16	0.77	1.16
INLET PRESSURE	25 psi	237	173	136	103	335	246	192	146	244	184
	30 psi	327	240	187	142	464	341	266	203	338	258
	35 psi	385	282	221	168	546	401	314	239	400	304
	40 psi	429	315	247	187	611	449	351	267	446	340
	45 psi	467	342	268	203	663	488	381	290	486	370
	50 psi	499	366	287	218	710	521	408	311	520	396
	55 psi	528	387	303	230	752	552	432	329	550	418
	60 psi	554	406	318	241	788	579	453	345	578	440

SPECIFYING MODEL NUMBER

Reference for Ordering Information Chart

SAMPLE MODEL NUMBER

TLHCVXR3-1210

(A) TLHCVXR3 (B) (C) (A) (D)

A Techline HCVXR Dripline = **TLHCVXR**

B EMITTER FLOW RATE
- 0.33 GPH = **3**
- 0.53 GPH = **5**
- 0.77 GPH = **7**
- 1.16 GPH = **11**

C EMITTER SPACING
- 12″ = **12**
- 18″ = **18**
- 24″ = **24**

D COIL LENGTH
- 100′ = **01**
- 250′ = **025**
- 500′ = **05**
- 1,000′ = **10**

BLANK TUBING MODEL NUMBERS:

100′ = TLHCVXR001 250′ = TLHCVXR0025
500′ = TLHCVXR005 1,000′ = TLHCVXR010

Maximum Uniformity in
Subsurface and On-Surface
Including Slopes

TECHLINE® CV

17mm DRIPLINE

APPLICATIONS

- Subsurface or on-surface installations
- Turf, shrubs, trees and flowers
- Sports turf, tennis courts, golf courses
- Slopes
- Longer lateral runs
- Curved, angular or narrow planting areas
- High traffic/high liability areas
- Areas subject to vandalism
- High wind areas
- At-grade windows
- Green walls, green roofs
- Raised planters

SPECIFICATIONS

- Broadest choice of emitter flow rates: 0.26, 0.4, 0.6 and 0.9 GPH
- Emitter spacings: 12", 18" and 24" (24" spacing available for 0.6 and 0.9 GPH only)
- Pressure compensation range: 14.5 to 58 psi
- Bending radius: 7"
- Maximum recommended system pressure: 58 psi
- Minimum pressure required: 14.5 psi
- Tubing diameter: 0.66" OD; 0.56" ID; 0.050" wall
- Coil lengths: 100', 250', 500', 1,000'
- Recommended minimum filtration: 120 mesh
- Diaphragm made of silicon
- ISO 9261 Standard Compliance

FEATURES & BENEFITS

2 psi CHECK VALVE IN EACH EMITTER

All emitters turn on and off at the same time, maximizing balance of application. Holds back up to 4.6' of water (elevation change). No low emitter drainage, great on slopes. Delivers more precise watering.

UNIQUE PATENTED EMITTER DESIGN WITH PHYSICAL ROOT BARRIER

Offset flow path, extra large bath area and raised outlet prevent root intrusion without chemical reliance.

PRESSURE COMPENSATING

Precise and equal amounts of water are delivered over a broad pressure range.

CONTINUOUS SELF-FLUSHING EMITTER DESIGN

Flushes debris as it is detected, throughout operation, not just at the beginning or end of a cycle, ensuring uninterrupted emitter operation.

EMITTER WITH ANTI-SIPHON FEATURE

Prevents ingestion of debris into tubing caused by vacuum.

SELF-CONTAINED, ONE-PIECE DRIPLINE CONSTRUCTION

Assures reliable, easy installation.

FLEXIBLE UV RESISTANT TUBING

Adapts to any planting area shape - tubing curves at a 7" radius. For on-surface installations withstands heat and direct sun.

MAKES INSTALLATION QUICKER

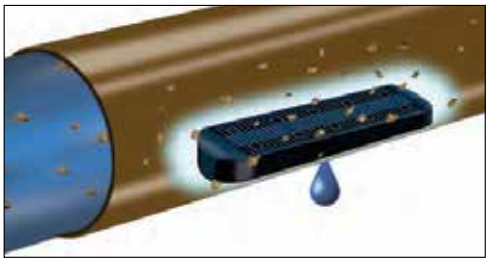
Does not require air/vacuum relief vent or automatic flush valve for on-surface or subsurface installations. Use manual flush valves at exhaust headers.

LASER ETCHING FOR EASY IDENTIFICATION

TECHLINE CV MADE WITH POST CONSUMER RECYCLED MATERIAL

QUALIFIES FOR USE ON LEED PROJECTS

TECHLINE® CV



Water flows through the tubing and enters the emitter through the inlet filter. Any debris that gets past the Netafim filter and enters the emitter will be flushed out by the continuously self-flushing emitters.

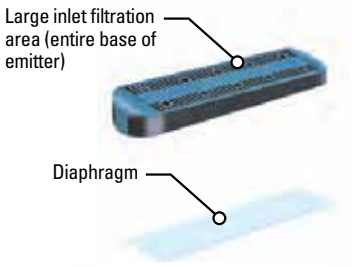
DESIGN CALCULATOR
DOWNLOAD FROM THE APP STORE OR GOOGLE PLAY

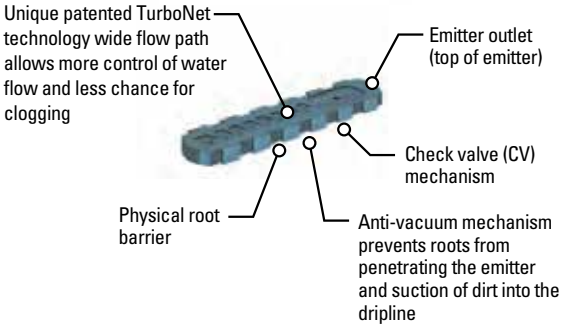
GENERAL GUIDELINES

	TURF												SHRUB & GROUNDCOVER											
	CLAY SOIL			LOAM SOIL			SANDY SOIL			COARSE SOIL			CLAY SOIL			LOAM SOIL			SANDY SOIL			COARSE SOIL		
EMITTER FLOW	0.26 GPH			0.4 GPH			0.6 GPH			0.9 GPH			0.26 GPH			0.4 GPH			0.6 GPH			0.9 GPH		
EMITTER SPACING	18″			12″			12″			12″			18″			18″			12″			12″		
LATERAL (ROW) SPACING	18″	20″	22″	12″	14″	18″	12″	14″	18″	12″	14″	16″	18″	21″	24″	18″	21″	24″	16″	18″	20″	16″	18″	20″
BURIAL DEPTH	Bury evenly throughout the zone from 4″to 6″												On-surface or bury evenly throughout the zone to a maximum of 6″											
APPLICATION RATE (INCHES/HOUR)	0.19	0.17	0.15	0.64	0.55	0.43	0.98	0.84	0.65	1.48	1.27	1.11	0.19	0.16	0.14	0.30	0.26	0.23	0.73	0.65	0.59	1.11	0.99	0.89
TIME TO APPLY ¼″ OF WATER (MINUTES)	80	89	97	23	27	35	15	18	23	10	12	13	80	93	106	50	58	66	20	23	26	13	15	17
Following these maximum spacing guidelines, emitter flow selection can be increased if desired by the designer. 0.9 GPH flow rate available for areas requiring higher infiltration rates, such as coarse sandy soils.																								

Note: 0.4, 0.6 and 0.9 GPH are nominal flow rates. Actual flow rates used in the calculations are 0.42, 0.61 and 0.92 GPH.

EXPLODED VIEW OF TECHLINE CV EMITTER





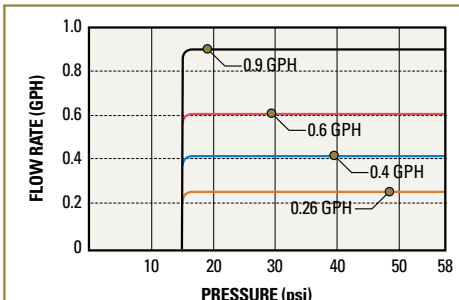
MAXIMUM LENGTH OF A SINGLE LATERAL (FEET)

EMITTER SPACING		12″				18″				24″	
EMITTER FLOW (GPH)		0.26	0.4	0.6	0.9	0.26	0.4	0.6	0.9	0.6	0.9
INLET PRESSURE	20 psi	331	242	190	144	468	344	270	204	342	260
	25 psi	413	302	238	180	584	429	338	257	430	326
	35 psi	518	380	299	227	737	540	426	323	542	412
	45 psi	594	436	343	260	845	620	489	371	622	472
	55 psi	655	480	378	287	932	684	539	410	686	522
	60 psi	681	500	393	298	969	713	561	426	716	544

FLOW PER 100 FEET

EMITTER SPACING	0.26 EMITTER		0.4 EMITTER		0.6 EMITTER		0.9 EMITTER	
	GPH	GPM	GPH	GPM	GPH	GPM	GPH	GPM
12″	26.4	0.44	42.3	0.71	60.8	1.01	92.5	1.54
18″	17.6	0.29	28.2	0.47	40.5	0.68	61.6	1.03
24″	-	-	-	-	30.4	0.51	46.2	0.77

FLOW RATE VS. PRESSURE



Techline CV emitters open at 14.5 psi and close at 2 psi.

SPECIFYING MODEL NUMBER

Reference for Ordering Information Chart

SAMPLE MODEL NUMBER: **TLCV4-1210** (B C / A D)

A Techline CV Dripline = **TLCV**

B EMITTER FLOW RATE
- 0.26 GPH = **26**
- 0.4 GPH = **4**
- 0.6 GPH = **6**
- 0.9 GPH = **9**

C EMITTER SPACING
- 12″ = **12**
- 18″ = **18**
- 24″ = **24**

D COIL LENGTH
- 100′ = **01**
- 250′ = **025**
- 500′ = **05**
- 1,000′ = **10**

BLANK TUBING MODEL NUMBERS:

100′ = TLCV001 250′ = TLCV0025
500′ = TLCV005 1,000′ = TLCV010

ORDERING INFORMATION

FLOW RATE	EMITTER SPACING	COIL LENGTH	MODEL NUMBER
0.26 GPH	12″	100′	TLCV26-1201
		250′	TLCV26-12025
		1,000′	TLCV26-1210
	18″	100′	TLCV26-1801
		250′	TLCV26-18025
		1,000′	TLCV26-1810
0.4 GPH	12″	100′	TLCV4-1201
		250′	TLCV4-12025
		1,000′	TLCV4-1210
	18″	100′	TLCV4-1801
		250′	TLCV4-18025
		1,000′	TLCV4-1810
0.6 GPH	12″	100′	TLCV6-1201
		250′	TLCV6-12025
		500′	TLCV6-1205
		1,000′	TLCV6-1210
	18″	100′	TLCV6-1801
		250′	TLCV6-18025
		500′	TLCV6-1805
		1,000′	TLCV6-1810
	24″	100′	TLCV6-2401
		250′	TLCV6-24025
		1,000′	TLCV6-2410
0.9 GPH	12″	100′	TLCV9-1201
		250′	TLCV9-12025
		500′	TLCV9-1205
		1,000′	TLCV9-1210
	18″	100′	TLCV9-1801
		250′	TLCV9-18025
		500′	TLCV9-1805
		1,000′	TLCV9-1810
	24″	100′	TLCV9-2401
		250′	TLCV9-24025
		1,000′	TLCV9-2410
BLANK TUBING		100′	TLCV001
		250′	TLCV0025
		500′	TLCV005
		1,000′	TLCV010

Schumacher IRRIGATION
Your Irrigation Superstore
Email: irrigate@schumacherirrigation.com
www.schumacherirrigation.com
Toll Free: 800-246-3685
Phone: 402-246-3685
Fax: 402-246-2072

TECHLINE® DL

Maximum Uniformity in Subsurface and On-Surface Including Slopes

17mm DRIPLINE

APPLICATIONS

- Subsurface or on-surface installations
- Curved, angular or narrow planting areas
- High traffic/high liability areas
- Areas subject to vandalism
- High wind areas
- Turf, shrubs, trees
- Slopes
- At-grade windows
- Sports turf

SPECIFICATIONS

- Emitter flow rates: 0.26, 0.4, 0.6 and 0.9 GPH
- Emitter spacings: 12", 18" or 24" (24" available in 0.6 and 0.9 GPH only)
- Pressure compensation range: 6 to 58 psi
- Bending radius: 7"
- Maximum recommended system pressure: 58 psi
- Minimum pressure required: 6 psi
- Tubing diameter: 0.66" OD; 0.56" ID; 0.050" wall
- Coil lengths: 100', 250', 500', 1,000'
- Recommended minimum filtration: 120 mesh
- Diaphragm made of silicon
- ISO 9261 Standard Compliance

FEATURES & BENEFITS

THE FIRST ANTI-SIPHON EMITTER IN LANDSCAPE DRIPLINE

Emitter manufactured and successfully used in harsh agricultural applications since 2000. Emitter is pressure compensating and continuous flushing.

EMITTER WITH ANTI-SIPHON FEATURE

Prevents ingestion of debris into tubing caused by vacuum.

SELF-CONTAINED, ONE-PIECE DRIPLINE CONSTRUCTION

Assures reliable, easy installation.

FLEXIBLE UV RESISTANT TUBING

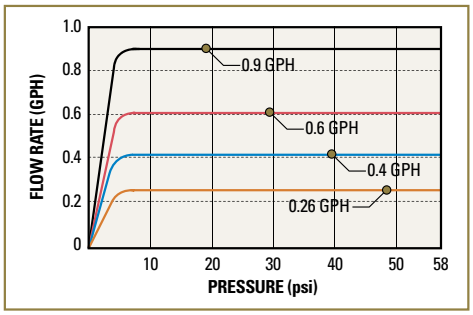
Adapts to any planting area shape - tubing curves at a 7" radius. For on-surface installations withstands heat and direct sun.

LASER ETCHING FOR EASY IDENTIFICATION

TECHLINE DL MADE WITH POST CONSUMER RECYCLED MATERIAL

QUALIFIES FOR USE ON LEED PROJECTS

FLOW RATE VS. PRESSURE



TECHLINE® DL

GENERAL GUIDELINES

	TURF												SHRUB & GROUNDCOVER											
	CLAY SOIL			LOAM SOIL			SANDY SOIL			COARSE SOIL			CLAY SOIL			LOAM SOIL			SANDY SOIL			COARSE SOIL		
EMITTER FLOW	0.26 GPH			0.4 GPH			0.6 GPH			0.9 GPH			0.26 GPH			0.4 GPH			0.6 GPH			0.9 GPH		
EMITTER SPACING	18″			12″			12″			12″			18″			18″			12″			12″		
LATERAL (ROW) SPACING	18″	20″	22″	18″	20″	22″	12″	14″	16″	12″	14″	16″	18″	21″	24″	18″	21″	24″	16″	18″	20″	16″	18″	20″
BURIAL DEPTH	Bury evenly throughout the zone from 4″to 6″												On-surface or bury evenly throughout the zone to a maximum of 6″											
APPLICATION RATE (INCHES/HOUR)	0.19	0.17	0.15	0.30	0.27	0.25	0.98	0.84	0.73	1.48	1.27	1.11	0.19	0.16	0.14	0.30	0.26	0.23	0.73	0.65	0.59	1.11	0.99	0.89
TIME TO APPLY ¼″ OF WATER (MINUTES)	80	89	97	50	55	61	15	18	20	10	12	13	80	93	106	50	58	66	20	23	26	13	15	17
Following these maximum spacing guidelines, emitter flow selection can be increased if desired by the designer. 0.9 GPH flow rate available for areas requiring higher infiltration rates, such as coarse sandy soils.																								

Note: 0.4, 0.6 and 0.9 GPH are nominal flow rates. Actual flow rates used in the calculations are 0.42, 0.61 and 0.92 GPH. air/vacuum relief air vents required.

MAXIMUM LENGTH OF A SINGLE LATERAL (FEET)

EMITTER SPACING		12″				18″				24″	
EMITTER FLOW (GPH)		0.26	0.4	0.6	0.9	0.26	0.4	0.6	0.9	0.6	0.9
INLET PRESSURE	10 psi	332	244	192	146	461	338	267	203	332	252
	20 psi	512	376	297	225	711	524	413	314	518	394
	25 psi	569	418	330	250	792	582	459	350	576	438
	35 psi	659	484	382	290	918	675	533	405	670	510
	45 psi	730	537	423	321	1,019	750	591	450	742	566
	55 psi	790	581	458	348	1,103	812	641	488	804	612
	60 psi	818	601	474	360	1,140	840	663	504	832	634

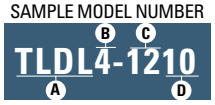
FLOW PER 100 FEET

EMITTER SPACING	0.26 EMITTER		0.4 EMITTER		0.6 EMITTER		0.9 EMITTER	
	GPH	GPM	GPH	GPM	GPH	GPM	GPH	GPM
12″	26.4	0.44	42.3	0.71	60.8	1.01	92.5	1.54
18″	17.6	0.29	28.2	0.47	40.5	0.68	61.6	1.03
24″	-	-	-	-	30.4	0.51	46.2	0.77

SPECIFYING MODEL NUMBER

Reference for Ordering Information Chart

SAMPLE MODEL NUMBER



A Techline DL Dripline = **TLDL**

B EMITTER FLOW RATE
0.26 GPH = **26**
0.4 GPH = **4**
0.6 GPH = **6**
0.9 GPH = **9**

C EMITTER SPACING
12″ = **12**
18″ = **18**
24″ = **24**

D COIL LENGTH
100′ = **01**
250′ = **025**
500′ = **05**
1,000′ = **10**

BLANK TUBING MODEL NUMBERS:
100′ = TLDL001 250′ = TLDL0025
500′ = TLDL005 1,000′ = TLDL010

ORDERING INFORMATION

FLOW RATE	EMITTER SPACING	COIL LENGTH	MODEL NUMBER
0.26 GPH	12″	100′	TLDL26-1201
		250′	TLDL26-12025
		1,000′	TLDL26-1210
	18″	100′	TLDL26-1801
		250′	TLDL26-18025
		1,000′	TLDL26-1810
0.4 GPH	12″	100′	TLDL4-1201
		250′	TLDL4-12025
		1,000′	TLDL4-1210
	18″	100′	TLDL4-1801
		250′	TLDL4-18025
		1,000′	TLDL4-1810
0.6 GPH	12″	100′	TLDL6-1201
		250′	TLDL6-12025
		500′	TLDL6-1205
		1,000′	TLDL6-1210
	18″	100′	TLDL6-1801
		250′	TLDL6-18025
		500′	TLDL6-1805
		1,000′	TLDL6-1810
	24″	100′	TLDL6-2401
		250′	TLDL6-24025
		1,000′	TLDL6-2410
0.9 GPH	12″	100′	TLDL9-1201
		250′	TLDL9-12025
		500′	TLDL9-1205
		1,000′	TLDL9-1210
	18″	100′	TLDL9-1801
		250′	TLDL9-18025
		500′	TLDL9-1805
		1,000′	TLDL9-1810
	24″	100′	TLDL9-2401
		250′	TLDL9-24025
		1,000′	TLDL9-2410
BLANK TUBING		100′	TLDL001
		250′	TLDL0025
		500′	TLDL005
		1,000′	TLDL010

TECHLINE® RW and RWP

For Reclaimed Water Use

17mm DRIPLINE

APPLICATIONS

- Reclaimed (recycled) water use
- For irrigation with non-potable/ reclaimed water and soil loading

SPECIFICATIONS

- Emitter flow rates: 0.26, 0.4, 0.6 and 0.9 GPH
- Emitter spacings: 12", 18" and 24"
- Pressure compensation range: 7 to 58 psi
- Bending radius: 7"
- Maximum recommended system pressure: 58 psi
- Minimum pressure required: 6 psi
- Tubing diameter: 0.66" OD; 0.56" ID; 0.050" wall
- Coil lengths: 250' and 1,000'
- Recommended minimum filtration: 120 mesh
- Diaphragm made of silicon
- ISO 9261 Standard Compliance

TECHLINE RW AND RWP ARE DESIGNED FOR RECLAIMED WATER USE ONLY

Reclaimed, reuse or recycled water is municipally-treated, non-potable water deemed appropriate for use in irrigation systems and not wastewater being dispersed into the soil for additional treatment. Please consult your local Water Management District for regulations regarding the type of water being used, and its proper system design. Netafim USA can provide assistance on drip dispersal that uses primary or secondary and tertiary wastewater. Please contact Netafim USA Customer Service for more information.

FEATURES & BENEFITS

UNIQUE PATENTED EMITTER DESIGN WITH PHYSICAL ROOT BARRIER

Emitters prevent root intrusion without chemical reliance.

PRESSURE COMPENSATING

Precise and equal amounts of water are delivered over a broad pressure range.

CONTINUOUS SELF-FLUSHING EMITTER DESIGN

Flushes debris as it is detected, throughout operation, not just at the beginning or end of a cycle, ensuring uninterrupted emitter operation.

EMITTER WITH ANTI-SIPHON FEATURE

Prevents ingestion of debris into tubing caused by vacuum.

SELF-CONTAINED, ONE-PIECE DRIPLINE CONSTRUCTION

Assures reliable, easy installation.

FLEXIBLE UV RESISTANT TUBING

Adapts to any planting area shape - tubing curves at a 7" radius. For on-surface installations withstands heat and direct sun.

TECHLINE RW

Purple striped dripline

TECHLINE RWP

Solid purple dripline

LASER ETCHING FOR EASY IDENTIFICATION

TECHLINE RW & RWP MADE WITH POST CONSUMER RECYCLED MATERIAL

QUALIFIES FOR USE ON LEED PROJECTS

TECHLINE® RW and RWP

GENERAL GUIDELINES

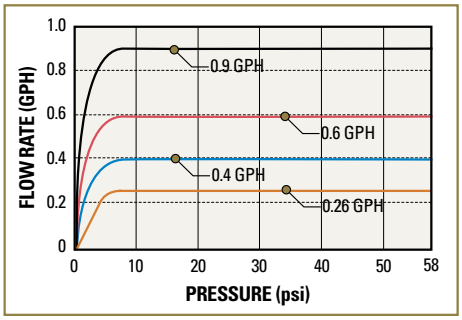
	TURF												SHRUB & GROUNDCOVER											
	CLAY SOIL			LOAM SOIL			SANDY SOIL			COARSE SOIL			CLAY SOIL			LOAM SOIL			SANDY SOIL			COARSE SOIL		
EMITTER FLOW	0.26 GPH			0.4 GPH			0.6 GPH			0.9 GPH			0.26 GPH			0.4 GPH			0.6 GPH			0.9 GPH		
EMITTER SPACING	18″			12″			12″			12″			18″			18″			12″			12″		
LATERAL (ROW) SPACING	18″	20″	22″	18″	20″	22″	12″	14″	16″	12″	14″	16″	18″	21″	24″	18″	21″	24″	16″	18″	20″	16″	18″	20″
BURIAL DEPTH	Bury evenly throughout the zone from 4″to 6″												On-surface or bury evenly throughout the zone to a maximum of 6″											
APPLICATION RATE (INCHES/HOUR)	0.19	0.17	0.15	0.30	0.27	0.25	0.98	0.84	0.73	1.48	1.27	1.11	0.19	0.16	0.14	0.30	0.26	0.23	0.73	0.65	0.59	1.11	0.99	0.89
TIME TO APPLY ¼″ OF WATER (MINUTES)	80	89	97	50	55	61	15	18	20	10	12	13	80	93	106	50	58	66	20	23	26	13	15	17
Following these maximum spacing guidelines, emitter flow selection can be increased if desired by the designer. 0.9 GPH flow rate available for areas requiring higher infiltration rates, such as coarse sandy soils.																								

Note: 0.4, 0.6 and 0.9 GPH are nominal flow rates. Actual flow rates used in the calculations are 0.42, 0.61 and 0.92 GPH.
air/vacuum relief air vents required.

MAXIMUM LENGTH OF A SINGLE LATERAL (FEET)

EMITTER SPACING		12″				18″				24″	
EMITTER FLOW (GPH)		0.26	0.4	0.6	0.9	0.26	0.4	0.6	0.9	0.6	0.9
INLET PRESSURE	10 psi	332	244	192	146	461	338	267	203	332	252
	20 psi	512	376	297	225	711	524	413	314	518	394
	25 psi	569	418	330	250	792	582	459	350	576	438
	35 psi	659	484	382	290	918	675	533	405	670	510
	45 psi	730	537	423	321	1,019	750	591	450	742	566
	55 psi	790	581	458	348	1,103	812	641	488	804	612
	60 psi	818	601	474	360	1,140	840	663	504	832	634

FLOW RATE VS. PRESSURE



FLOW PER 100 FEET

EMITTER SPACING	0.26 EMITTER		0.4 EMITTER		0.6 EMITTER		0.9 EMITTER	
	GPH	GPM	GPH	GPM	GPH	GPM	GPH	GPM
12″	26.4	0.44	42.3	0.71	60.8	1.01	92.5	1.54
18″	17.6	0.29	28.2	0.47	40.5	0.68	61.6	1.03
24″	-	-	21.2	0.35	30.4	0.51	46.2	0.77

SPECIFYING MODEL NUMBER

Reference for Ordering Information Chart

SAMPLE MODEL NUMBER

TLRW4-1210 (A B C D)

A Techline RW Dripline = **TLRW**
Techline RWP Dripline = **TLRWP**

B EMITTER FLOW RATE
0.26 GPH = **26**
0.4 GPH = **4**
0.6 GPH = **6**
0.9 GPH = **9**

C EMITTER SPACING
12″ = **12**
18″ = **18**
24″ = **24**

D COIL LENGTH
250′ = **250**
1,000′ = **10**

BLANK TUBING MODEL NUMBERS:
1,000′ = TLRW010 OR TLRWP010

ORDERING INFORMATION

FLOW RATE	EMITTER SPACING	COIL LENGTH	TLRW MODEL NUMBER	TLRWP MODEL NUMBER
0.26 GPH	12″	1,000′	TLRW26-1210	TLRWP26-1210
	18″	1,000′	TLRW26-1810	TLRWP26-1810
0.4 GPH	12″	250′	TLRW4-12025	TLRWP4-12025
	12″	1,000′	TLRW4-1210	TLRWP4-1210
	18″	250′	TLRW4-18025	TLRWP4-18025
	18″	1,000′	TLRW4-1810	TLRWP4-1810
	24″	1,000′	TLRW4-2410	TLRWP4-2410
0.6 GPH	12″	250′	TLRW6-12025	TLRWP6-12025
	12″	1,000′	TLRW6-1210	TLRWP6-1210
	18″	250′	TLRW6-18025	TLRWP6-18025
	18″	1,000′	TLRW6-1810	TLRWP6-1810
	24″	1,000′	TLRW6-2410	TLRWP6-2410
0.9 GPH	12″	250′	TLRW9-12025	TLRWP9-12025
	12″	1,000′	TLRW9-1210	TLRWP9-1210
	18″	250′	TLRW9-18025	TLRWP9-18025
	18″	1,000′	TLRW9-1810	TLRWP9-1810
	24″	1,000′	TLRW9-2410	TLRWP9-2410
BLANK TUBING		1,000′	TLRW010	TLRWP010

TECHLINE® EZ

Ideal for Small and Medium Areas

12mm DRIPLINE

APPLICATIONS

- Subsurface or on-surface installations
- Bed areas that require shorter lateral lengths
- Areas subject to vandalism
- Planting areas
- Curved, narrow, and angular planting areas
- Flower beds, trees, and shrubs
- Rooftop gardens
- Vegetable gardens
- Green walls
- High traffic or high liability areas
- Raised planters

SPECIFICATIONS

- Emitter flow rates: 0.26, 0.4, 0.6 and 0.9 GPH
- Emitter spacings: 6", 12" and 18" (6" available for 0.26 and 0.4 GPH only)
- Uses 12mm Netafim insert fittings or any compression fitting for 0.426" diameter tubing
- Pressure compensation range: 6 to 58 psi
- Bending radius: 6"
- Maximum recommended system pressure: 58 psi
- Minimum pressure required: 6 psi
- Tubing diameter: 0.510" O.D.; 0.426" I.D.
- Coil lengths: 200', 250', 300', 500', 1,000'
- Recommended minimum filtration: 120 mesh
- Diaphragm made of silicon
- ISO 9261 Standard Compliance

FEATURES & BENEFITS

THE FIRST ANTI-SIPHON EMITTER IN LANDSCAPE DRIPLINE

Emitter manufactured and successfully used in harsh agricultural applications since 2000. Emitter is pressure compensating and continuous flushing.

LESS VISUALLY OBTRUSIVE

12mm diameter tubing is less noticeable in landscape installations.

EMITTER WITH ANTI-SIPHON FEATURE

Prevents ingestion of debris into tubing caused by vacuum.

SELF-CONTAINED, ONE-PIECE DRIPLINE CONSTRUCTION

Assures reliable, easy installation.

FLEXIBLE UV RESISTANT TUBING

Adapts to any planting area shape - tubing curves at a 6" radius. For on-surface installations withstands heat and direct sun.

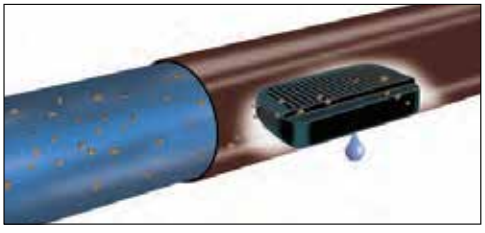
MORE COST EFFECTIVE IN SMALLER BED AREAS

24% smaller diameter tubing.

LASER ETCHING FOR EASY IDENTIFICATION

TECHLINE EZ MADE WITH POST CONSUMER RECYCLED MATERIAL

QUALIFIES FOR USE ON **LEED PROJECTS**



TECHLINE® EZ

GENERAL GUIDELINES

	TURF												SHRUB & GROUNDCOVER											
	CLAY SOIL			LOAM SOIL			SANDY SOIL			COARSE SOIL			CLAY SOIL			LOAM SOIL			SANDY SOIL			COARSE SOIL		
EMITTER FLOW	0.26 GPH			0.4 GPH			0.6 GPH			0.9 GPH			0.26 GPH			0.4 GPH			0.6 GPH			0.9 GPH		
EMITTER SPACING	18″			12″			12″			12″			18″			18″			12″			12″		
LATERAL (ROW) SPACING	18″	20″	22″	18″	20″	22″	12″	14″	16″	12″	14″	16″	18″	21″	24″	18″	21″	24″	16″	18″	20″	16″	18″	20″
BURIAL DEPTH	Bury evenly throughout the zone from 4″to 6″												On-surface or bury evenly throughout the zone to a maximum of 6″											
APPLICATION RATE (INCHES/HOUR)	0.19	0.17	0.15	0.45	0.41	0.37	0.96	0.83	0.72	1.44	1.24	1.08	0.19	0.16	0.14	0.29	0.24	0.21	0.72	0.64	0.58	1.08	0.96	0.87
TIME TO APPLY ¼″ OF WATER (MINUTES)	81	90	99	33	37	41	16	18	21	10	12	14	81	94	108	53	61	70	21	23	26	14	16	17
Following these maximum spacing guidelines, emitter flow selection can be increased if desired by the designer. 0.9 GPH flow rate available for areas requiring higher infiltration rates, such as coarse sandy soils.																								

Note: 0.4, 0.6 and 0.9 GPH are nominal flow rates. Actual flow rates used in the calculations are 0.42, 0.61 and 0.92 GPH.
air/vacuum relief air vents required.

FLOW PER 100 FEET

EMITTER SPACING	0.26 EMITTER		0.4 EMITTER		0.6 EMITTER		0.9 EMITTER	
	GPH	GPM	GPH	GPM	GPH	GPM	GPH	GPM
6″	52.8	0.88	84.0	1.40	Not Standard		Not Standard	
12″	26.4	0.44	42.3	0.71	60.8	1.01	92.5	1.54
18″	17.6	0.29	28.2	0.47	40.5	0.68	61.6	1.03

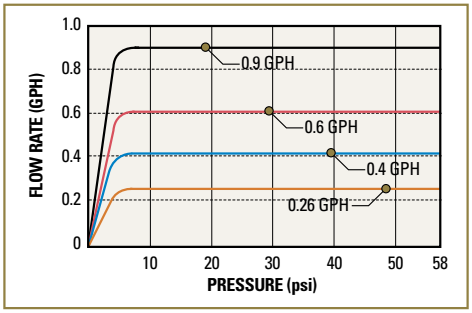
MAXIMUM LENGTH OF A SINGLE LATERAL (FEET)

EMITTER SPACING		6″		12″				18″			
EMITTER FLOW (GPH)		0.26	0.42	0.26	0.4	0.6	0.9	0.26	0.4	0.6	0.9
INLET PRESSURE	10 psi	93	68	173	126	99	75	243	179	140	105
	20 psi	143	105	265	194	153	116	374	275	216	164
	25 psi	158	116	294	216	170	129	416	305	240	182
	35 psi	183	134	340	250	196	149	480	353	278	212
	45 psi	202	148	377	276	218	165	533	392	308	234
	55 psi	219	160	407	299	235	178	576	423	333	254
	60 psi	226	166	421	309	243	184	596	438	345	263

ORDERING INFORMATION

FLOW RATE	EMITTER SPACING	COIL LENGTH	MODEL NUMBER
0.26 GPH	6″	300′	TLEZ26-0603
		500′	TLEZ26-0605
		1,000′	TLEZ26-0610
	12″	300′	TLEZ26-1203
		500′	TLEZ26-1205
		1,000′	TLEZ26-1210
	18″	300′	TLEZ26-1803
		500′	TLEZ26-1805
		1,000′	TLEZ26-1810
0.4 GPH	6″	200′	TLEZ4-0602
		500′	TLEZ4-0605
		1,000′	TLEZ4-0610
	12″	200′	TLEZ4-1202
		500′	TLEZ4-1205
		1,000′	TLEZ4-1210
	18″	200′	TLEZ4-1802
		500′	TLEZ4-1805
		1,000′	TLEZ4-1810
0.6 GPH	12″	300′	TLEZ6-1203
		500′	TLEZ6-1205
		1,000′	TLEZ6-1210
	18″	250′	TLEZ6-18025
		500′	TLEZ6-1805
		1,000′	TLEZ6-1810
0.9 GPH	12″	200′	TLEZ9-1202
		500′	TLEZ9-1205
		1,000′	TLEZ9-1210
	18″	200′	TLEZ9-1802
		500′	TLEZ9-1805
		1,000′	TLEZ9-1810
BLANK TUBING		250′	TLEZ0025
		500′	TLEZ005

FLOW RATE VS. PRESSURE



SPECIFYING MODEL NUMBER

Reference for Ordering Information Chart

SAMPLE MODEL NUMBER: TLEZ4-1210 (B C / A D)

A Techline EZ Dripline = **TLEZ**

B EMITTER FLOW RATE
- 0.26 GPH = **26**
- 0.4 GPH = **4**
- 0.6 GPH = **6**
- 0.9 GPH = **9**

C EMITTER SPACING
- 6″ = **6**
- 12″ = **12**
- 18″ = **18**

D COIL LENGTH
- 200′ = **02**
- 250′ = **025**
- 300′ = **03**
- 500′ = **05**
- 1,000′ = **10**

BLANK TUBING MODEL NUMBERS:
250′ = TLEZ0025 500′ = TLEZ005

17mm FITTINGS & INSTALLATION TOOLS

FOR TECHLINE® HCVXR, CV, DL, RW and RWP

APPLICATIONS

- Fits Techline HCVXR, CV, DL, RW and RWP Driplines, and PE irrigation hose

SPECIFICATIONS

- Acceptable hose sizes: 0.56" - 0.60" inside diameter

FEATURES & BENEFITS

BARBED FITTINGS

For secure fit and easy installation without clamps, glue or tools.

UV RESISTANT

Withstands heat, direct sun and harsh chemicals.

ONE-PIECE CONSTRUCTION

For added strength, durability and long-term performance.

ALLOWS FOR EASY ON-SITE INSPECTION

For proper fitting and installation.

INSERT COUPLING
Model TLCOUP

1/2" MPT ADAPTER
Model TL050MA

INSERT ADAPTER FOR 1" OR LARGER PE
(requires 11mm or 7/16" punch)
Model TLIAPE-B

INSERT ADAPTER FOR 1 1/2" OR LARGER PVC
(requires TDBIT16.5)
Model TLIAPVC-B

INSERT ELBOW
Model TLELL

3/4" MPT ADAPTER
Model TL075MA

INSERT CROSS
(requires 11mm or 7/16" punch)
Model TLCROS

EMITTER MICRO-TUBING ADAPTER
Model TLMTUBEADP

17mm FITTINGS

INSERT TEE
Model TLTEE

COMBINATION TEE
INS x INS x 3/4" FPT
Model TL075FTEE

3/4" MPT x 'V'
Model TL2W075MA

6" SOIL STAPLE
(Place approximately every 3' - 5' of tubing, plus two on each tee, elbow or cross)
Model TLS6

FIGURE 8 LINE END
Model TLFIG8

MANUAL FLUSH VALVE
Model TLSOV

WHEELBARROW
TUBING DISPENSER
Model WBTD

DRILL BIT FOR PVC
INSERT ADAPTER
Model TDBIT16.5

PRESSURE GAUGE
(0-30 psi)
Model GAUGE30

PRESSURE GAUGE
(0-100 psi)
Model GAUGE100

SHRADER VALVE
(1/8" MPT)
Model 61APS1/8

SHRADER VALVE
ADAPTER
Model 61ACG

PRESSURE GAUGE
NEEDLE
Model 6809091

MPT = Male Pipe Thread
INS x INS = Insert x Insert
FPT = Female Pipe Thread

12mm FITTINGS & INSTALLATION TOOLS

FOR TECHLINE® EZ

APPLICATIONS

- Fits Techline EZ Dripline

SPECIFICATIONS

- Acceptable hose sizes: 0.426" inside diameter

FEATURES & BENEFITS

BARBED FITTINGS
For secure fit and easy installation without clamps, glue or tools.

UV RESISTANT
Withstands heat, direct sun and harsh chemicals.

ONE-PIECE CONSTRUCTION
For added strength, durability and long-term performance.

ALLOWS FOR EASY ON-SITE INSPECTION
For proper fitting and installation.

INSERT COUPLING
Model T12COUP

REDUCING COUPLING 12MM BARB x 17MM BARB
Model T12RCOUP

INSERT TEE
Model T12TEE

INSERT ELBOW
Model T12ELL

INSERT CROSS
Model T12CROSS

1/2" MPT ADAPTER
Model T12050MA

3/4" MPT ADAPTER
Model T12075MA

COMBINATION TEE INS x INS x 3/4" FPT
Model T12075FTEE

INSERT ADAPTER FOR 1" OR LARGER PE
Model T12IAPE-B

INSERT ADAPTER FOR 1 1/2" OR LARGER PVC
Model T12IAPVC-B

DRILL BIT FOR PVC INSERT ADAPTER
Model TDBIT16.5

3/4" MPT x 'V'
Model T122W075MA

MANUAL FLUSH VALVE
Model T12SOV

FIGURE 8 LINE END
Model T12FIG8

6" SOIL STAPLE
(Place approximately every 3'-5' of tubing, plus two on each tee, elbow or cross)
Model TLS6

FITTING COMBO PACKS

FITTING COMBO 3 PACK
Model T12COMBOPACK3

FITTING COMBO 4 PACK
Model T12COMBOPACK4

Schumacher IRRIGATION
Your Irrigation Superstore
Email: irrigate@schumacherirrigation.com
www.schumacherirrigation.com
Toll Free: 800-246-3685
Phone: 402-246-3685
Fax: 402-246-2072

DRIPLINE COMPONENTS

AIR VENTS OVERVIEW

AIR VENTS ARE USED TO CONTROL THE AIR IN IRRIGATION SYSTEMS FOR PROPER WATERING AND ACCURATE MEASUREMENT FOR FLOW AND WATER METERS

Controlling the air in irrigation systems controls the water flow and the most efficient way to control air is by the proper use of air vents. Both the presence of air and absence of air can cause problems and damage to irrigation systems. Netafim provides air vents to discharge and admit air as required.

Trapped air in pipes impedes water flow and can lower watering uniformity. It can also cause water hammer and damage to pipes and fittings. Air in pipes also produces inaccurate readings for water and flow meters. For reliable and accurate water measurement, flow meters require pipes to be full of water.

The absence of air in pipes can trigger contaminates such as mud and dirt to be drawn into the piping system.

Note: Netafim Techline® HCVXR and CV driplines have built-in check valves with an anti-siphon feature in each emitter that keeps the tubing charged with water. Therefore, air vents are not needed when installing Techline HCVXR and CV and a flow meter is not used. Air vents are also not needed for on-surface installations.

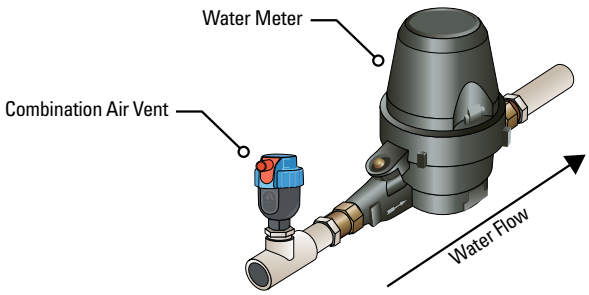
TWO TYPES OF AIR VENTS AVAILABLE:

Air/Vacuum Relief Air Vents

- Install in subsurface systems
- Not required for on-surface systems or when installing Techline HCVXR and CV dripline
- Discharges large volumes of air before a pipe is pressurized and admits large quantities of air when the pipe drains
- Also known as large orifice air vents, vacuum breakers, low pressure air vents, or air relief vents

Combination Air Vents

- Install before water meters or metering valves to ensure there is no air in the line for accurate flow readings
- Performs both functions as an air/vacuum relief vent and automatic air release vent
- Admits and discharges large volumes of air when needed, and releases small volumes of air continuously when the lines are pressurized
- Also known as double acting air vents



DRIPLINE COMPONENTS

AIR/VACUUM RELIEF AIR VENTS

APPLICATIONS

1/2" AIR VENTS

- Install in subsurface systems
- Not required when installing Techline® HCVXR and CV or on-surface installations

3/4", 1" AND 2" AIR VENTS

- Install in subsurface systems
- Not required when installing Techline HCVXR and CV or on-surface installations
- On sloping terrain to prevent collapsing of pipes caused by vacuum when pipe networks drain
- For air discharge during system start-up

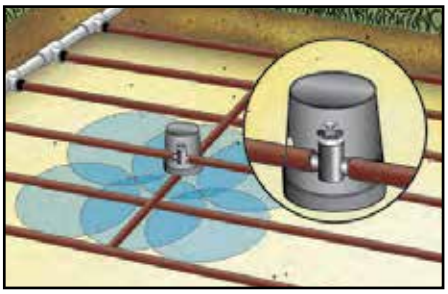
SPECIFICATIONS

1/2" AIR VENTS

- Maximum operating pressure: 140 psi

3/4", 1" AND 2" AIR VENTS

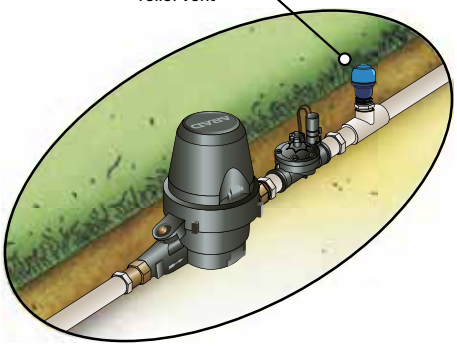
- Maximum operating pressure: 150 psi
- Made of corrosion-resistant reinforced UV protected composite materials - no metal parts to rust or corrode, no need for spare parts



1/2" MPT
Model TLAVRV

GUARDIAN
3/4" MPT Model 65ARIA075
1" MPT Model 65ARIA100

Guardian air/vacuum relief vent



2" FPT
Model 65ARIA2

MPT = Male Pipe Thread
FPT = Female Pipe Thread

COMBINATION AIR VENTS

APPLICATIONS

- For discharge of large volumes of air, along mains and at the end of mainlines
- Place before water meters and automatic metering valves for accurate flow readings
- Place at high points in pipe network or upstream of manifolds

SPECIFICATIONS

MINI

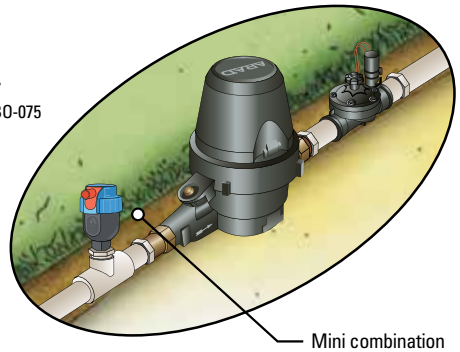
- Continuous acting
- Maximum operating pressure: 150 psi
- Sizes: ½" and ¾" MPT (2.4"w x 4.5"h)

COMBINATION

- Continuous acting
- Maximum operating pressure: 150 psi
- Size: 1" MPT (3.9"w x 5.5"h)

MINI
1/2" MPT Model AV-COMBO-050
3/4" MPT Model AV-COMBO-075

COMBINATION
1" MPT
Model 65ARIB1-150



Mini combination air vent

MPT = Male Pipe Thread

DRIPLINE COMPONENTS

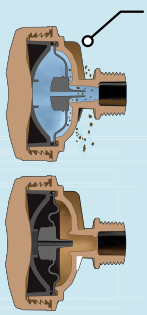
AUTOMATIC FLUSH VALVES

APPLICATIONS

- Drip irrigation systems
- Clean or dirty water

SPECIFICATIONS

- Not required with Techline® HCVXR and CV
- Flushing water volume: approximately 1 gallon per cycle
- Maximum zone flow rate per valve flush: 15 GPM
- Minimum pressure required: 1.5 psi
- Maximum operating pressure: 57 psi



FEATURES & BENEFITS

FLUSHING REDUCES SEDIMENT BUILD-UP

Eliminates clogging. Promotes long-term performance of the drip irrigation system.

AUTOMATIC CLEANING OPERATION

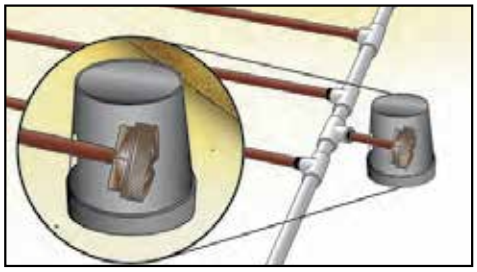
Eliminates periodic manual flushing.

UNIQUE DESIGN REACTS TO FLOW, NOT PRESSURE

Allows operation even at full line pressure.

DISASSEMBLES FOR WINTERIZATION 'BLOWOUT'

Protects your drip system.



AUTOMATIC FLUSH VALVE 1/2" MPT INLET
Model TL050MFV-1

AUTOMATIC FLUSH VALVE INSERT INLET
Model TLFV-1

MPT = Male Pipe Thread

IN-LINE CHECK VALVE

APPLICATIONS

- Prevents backflow of water and drainage of the system into low areas
- Eliminates the need for system water refill at the beginning of the next irrigation cycle
- For irrigating slopes where draining of the headers and laterals is common
- Designed to hold back up to a 13.4' column of water
- Rule of thumb: Every 1' of water exerts 0.433 psi of pressure at the base of the column. As such, a 100' column of water exerts 43.3 psi at the base.

SPECIFICATIONS

- Flow rate: 0.9 - 4.4 GPM
- Closing pressure: 5.8 psi (13.4 feet column of water)
- Opening pressure: 10.2 psi

FEATURES & BENEFITS

MANUFACTURED FROM DURABLE MATERIALS

For reliable operation.

LARGE INLET OPENING

Reduces headloss.

WIDE FLOW RANGE

For use in a number of applications.

IN-LINE CHECK VALVE 1/2" MPT
Model TLCV050M1-B

FLOW RATE VS. PRESSURE LOSS

FLOW RATE (GPM) VS. PRESSURE LOSS (psi)								
0.5	1	1.5	2	2.5	3	3.5	4	4.5
-	0.22	0.54	0.96	1.55	2.25	2.99	4.04	-

MPT = Male Pipe Thread

DRIPLINE COMPONENTS

OPERATION/PRESSURE INDICATOR STAKES

TECHLINE® HCVXR AND CV MISTER

SPECIFICATIONS

- Fogging rate: less than 2.0 GPH, creating a moistened area approximately 2' outward from nozzle
- Check valve: opens at 22 psi, closes at 10 psi
- Fogging nozzle maximum flow rate: 2.0 GPH @ 60 psi
- Pre-assembled with fogging nozzle, check valve, anchoring stake, tubing and barb connector

FEATURES & BENEFITS

FOGGING NOZZLE EMITS A FINE MIST

Indicates system operation and minimum required system pressure.

CREATES A MOISTENED AREA SURROUNDING THE FOGGER

Showing zone operation.

OPERATION

Techline CV emitters open at 14.5 psi line pressure.
Techline HCVXR emitters open at 21.8 psi line pressure.
Indicator stake's check valve opens and activates the fogging nozzle at 22 psi line pressure.

TECHLINE HCVXR AND CV MISTER
Model 10-CV-01

TECHLINE® DL AND EZ OPERATION FLAG

SPECIFICATIONS

- Down flag position (closed): 4.5 psi or lower
- Halfway flag position (45˚): 7 psi
- Upright flag position (90˚ or open): 10 psi or higher
- Pre-assembled with indicator flag, anchoring stake, tubing and barb connector

FEATURES & BENEFITS

FLAG RAISES TO INDICATE SYSTEM OPERATION

With just a minimum of 10 psi operating pressure.

OPERATION FLAG
Model 10-F-01

Low Flow and
High Flow Zones
with Disc or Screen Filter

LOW VOLUME CONTROL ZONE KITS

APPLICATIONS

- Designed for all dripline, drip and micro-spray zones
- Residential or commercial landscape irrigation applications
- For zones between 0.25 and 35 GPM

SPECIFICATIONS

¾" and 1" Low Flow Kits:
PRV flow range: 0.25 - 4.4 GPM
Regulated pressure: 42 psi

¾" and 1" High Flow Kits:
PRV flow range: 4.5 - 17.6 GPM
Regulated pressure: 57 psi

1 ½" High Flow Kits:
PRV flow range: 11 - 35 GPM
Regulated pressure: 57 psi

- Disc Filter mesh: 140
- Screen Filter mesh: 155
- Maximum pressure for all kits: 140 psi

FEATURES & BENEFITS

PRE-ASSEMBLED VALVE, FILTER AND PRESSURE REGULATOR

Saves installation and labor costs.

COMPACT DESIGN

¾", 1" and 1 ½" kits fit into standard 12"rectangular valve box.

WIDE RANGE OF FLOW RATES

For a variety of applications.

PROVEN DISC FILTER DESIGN

Provides superior filtration with 25 square inches of filtering surface.

AVAILABLE IN TWO STYLES

With a control valve or with no control valve.

LOW VOLUME CONTROL ZONE KITS COMPARISON CHART

	RESIDENTIAL AND COMMERCIAL LOW FLOW		RESIDENTIAL AND COMMERCIAL HIGH FLOW		COMMERCIAL	
	1" FPT INLET x 3/4" FPT OUTLET	3/4" MPT INLET x 3/4" FPT OUTLET	1" FPT INLET x 3/4" MPT OUTLET	3/4" MPT INLET x 3/4" MPT OUTLET	1 1/2" FPT INLET x 1 1/2" MPT OUTLET	1 1/2" MPT INLET x 1 1/2" MPT OUTLET
VALVE SPECIFICATIONS:						
SIZE	1"	No Valve	1"	No Valve	1 1/2"	No Valve
PRESSURE REGULATOR SPECIFICATIONS:						
SIZE	3/4"	3/4"	3/4"	3/4"	1 1/2"	1 1/2"
REGULATED PRESSURE	42 psi	42 psi	57 psi	57 psi	57 psi	57 psi
MANUAL FILTER SPECIFICATIONS:						
SIZE	3/4"	3/4"	3/4"	3/4"	1 1/2"	1 1/2"
DISC FILTER MESH	140 Mesh	140 Mesh	140 Mesh	140 Mesh	140 Mesh	140 Mesh
SCREEN FILTER MESH	155 Mesh	155 Mesh	155 Mesh	155 Mesh	155 Mesh	155 Mesh

Schumacher IRRIGATION
Your Irrigation Superstore
Email: irrigate@schumacherirrigation.com
www.schumacherirrigation.com
Toll Free: 800-246-3685
Phone: 402-246-3685
Fax: 402-246-2072

LOW VOLUME CONTROL

	DISC FILTERS		SCREEN FILTERS	
APPLICATION	**WITH VALVES**	**WITHOUT VALVES**	**WITH VALVES**	**WITHOUT VALVES**
COMMERCIAL High Flow: 11 to 35 GPM	 **KIT WITH 1 1/2" CONTROL VALVE** (1 1/2" FPT Inlet x 1 1/2" MPT Outlet) **LVCZ-150HP**	 **KIT WITH NO CONTROL VALVE** (1 1/2" MPT Inlet x 1 1/2" MPT Outlet) **LVCZ-150HP-NV**	 **KIT WITH 1 1/2" CONTROL VALVE** (1 1/2" FPT Inlet x 1 1/2" MPT Outlet) **LVCZSF-150HP**	 **KIT WITH NO CONTROL VALVE** (1 1/2" MPT Inlet x 1 1/2" MPT Outlet) **LVCZSF-150HP-NV**
RESIDENTIAL & COMMERCIAL High Flow: 4.5 to 17.6 GPM	 **HIGH FLOW KIT WITH 1" CONTROL VALVE** (1" FPT Inlet x 3/4" MPT Outlet) **LVCZ10075-HFHP**	 **HIGH FLOW KIT WITH NO CONTROL VALVE** (3/4" MPT Inlet x 3/4" MPT Outlet) **LVCZNV10075-HFHP**	 **HIGH FLOW KIT WITH 1" CONTROL VALVE** (1" FPT Inlet x 3/4" MPT Outlet) **LVCZSF10075-HFHP**	 **HIGH FLOW KIT WITH NO CONTROL VALVE** (3/4" MPT Inlet x 3/4" MPT Outlet) **LVCZNVSF10075-HFHP**
RESIDENTIAL & COMMERCIAL Low Flow: 0.25 to 4.4 GPM	 **LOW FLOW KIT WITH 1" CONTROL VALVE** (1" FPT Inlet x 3/4" FPT Outlet) **LVCZS8010075-LF**	 **LOW FLOW KIT WITH NO CONTROL VALVE** (3/4" MPT Inlet x 3/4" FPT Outlet) **LVCZNV10075-LF**	 **LOW FLOW KIT WITH 1" CONTROL VALVE** (1" FPT Inlet x 3/4" FPT Outlet) **LVCZS80SF10075-LF**	 **LOW FLOW KIT WITH NO CONTROL VALVE** (3/4" MPT Inlet x 3/4" FPT Outlet) **LVCZNVSF10075-LF**

FLOW RATE VS. PRESSURE LOSS

		DISC FILTERS		SCREEN FILTERS	
		WITH VALVE	**WITHOUT VALVE**	**WITH VALVE**	**WITHOUT VALVE**
APPLICATION	**FLOW RATE** (GPM)	**MINIMUM INLET PRESSURE (psi) TO ACHIEVE REGULATED OUTLET PRESSURE**			
COMMERCIAL High Flow: 11 to 35 GPM (57 psi Output)	10	64.4	61.4	64.4	61.4
	13	65.1	62.0	64.8	61.7
	17	65.6	62.3	65.4	62.1
	22	66.6	63.1	65.9	62.4
	26	67.3	63.7	66.6	63.0
	31	68.5	64.7	67.5	63.9
	35	70.0	66.3	68.9	65.2
RESIDENTIAL AND COMMERCIAL High Flow: 4.5 to 17.6 GPM (57 psi Output)	5	64.2	61.4	63.7	60.9
	10	68.0	64.5	65.7	62.2
	13	70.8	67.2	67.7	64.1
	17	75.2	71.3	69.7	65.8
RESIDENTIAL AND COMMERCIAL Low Flow: 0.25 to 4.4 GPM (42 psi Output)	1	47.0	45.1	46.9	45.0
	2	47.3	45.3	47.1	45.1
	3	47.8	45.5	47.5	45.2
	4	48.2	45.7	47.9	45.4
	5	48.8	46.0	48.3	45.5

*Example: See highlighted cell above - for a residential and commercial high flow kit with valve and screen filter at 10 GPM, input required = 65.7 psi for constant output of 57 psi (implied head loss = 8.7 psi)

ORDERING INFORMATION

DESCRIPTION	QTY	DISC FILTER MODEL NUMBER	SCREEN FILTER MODEL NUMBER
1" VALVE WITH ¾" LOW FLOW REGULATOR WITH ¾" FILTER	1	LVCZS8010075-LF	LVCZS80SF10075-LF
	6	LVCZS8010075-LF-B	LVCZS80SF10075-LF-B
1" VALVE WITH ¾" HIGH FLOW REGULATOR WITH ¾" FILTER	1	LVCZ10075-HFHP	LVCZSF10075-HFHP
	6	LVCZ10075-HFHP-B	LVCZSF10075-HFHP-B
1½" VALVE WITH 1½" HIGH FLOW REGULATOR WITH 1½" FILTER	1	LVCZ-150HP	LVCZSF-150HP
¾" LOW FLOW REGULATOR WITH ¾" FILTER, NO VALVE	1	LVCZNV10075-LF	LVCZNVSF10075-LF
	10	LVCZNV10075-LF-B	LVCZNVSF10075-LF-B
¾" HIGH FLOW REGULATOR WITH ¾" FILTER, NO VALVE	1	LVCZNV10075-HFHP	LVCZNVSF10075-HFHP
	10	LVCZNV10075-HFHP-B	LVCZNVSF1075HFHP-B
1½" HIGH FLOW REGULATOR WITH 1½" FILTER, NO VALVE	1	LVCZ-150HP-NV	LVCZSF-150HP-NV

PRESSURE REGULATORS

For Constant Outlet Pressure

APPLICATIONS

- All irrigation systems

SPECIFICATIONS

- ¾" Low Flow model: 0.25 to 4.4 GPM
- ¾" High Flow model: 4.5 to 17.6 GPM
- 1 ½" model: 11 to 35 GPM
- Other models available up to 175 GPM
- Maximum operating pressure: 145 psi

FEATURES & BENEFITS

EASY INLINE ASSEMBLY

¾" low flow model - female inlet/outlet. ¾" high flow model - female inlet and male outlet.

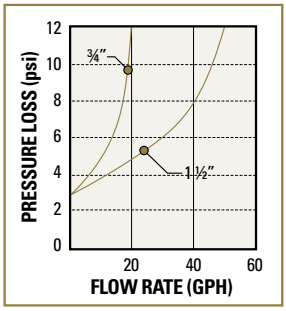
SEALED REGULATING MODULE

Available on ¾" high flow and 1 ½" pressure regulators.

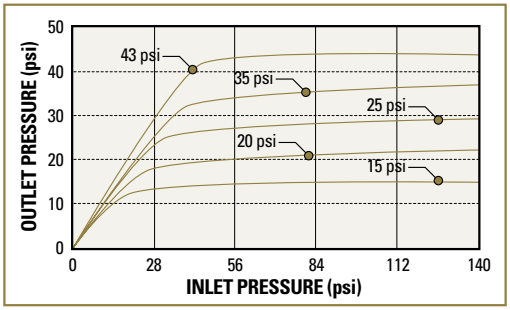
BUILT-IN INDICATOR ON ¾" HIGH FLOW AND LARGER MODELS

Indicates when proper outlet pressure is achieved.

FLOW RATE VS. PRESSURE LOSS



3/4" LOW FLOW - OUTLET VS. INLET PRESSURE (@13 GPM)



3/4" LOW FLOW

3/4" HIGH FLOW

1 1/2"

Exploded view of 3/4" high flow pressure regulator with replaceable pressure regulating module.

ORDERING INFORMATION

DESCRIPTION	psi	GPM	MODEL NUMBER
LOW FLOW INLINE ¾" FPT INLET x FPT OUTLET	15	0.25 to 4.4	PRV075LF15V2K
	20		PRV075LF20V2K
	25		PRV075LF25V2K
	35		PRV075LF35V2K
	42		PRV075LF42V2K
	50		PRV075LF50V2K
HIGH FLOW ¾" FPT INLET x MPT OUTLET	15	4.5 to 17.6	PRV075HF15V2K
	20		PRV075HF20V2K
	25		PRV075HF25V2K
	35		PRV075HF35V2K
	45		PRV075HF45V2K
	50		PRV075HF50V2K
	57		PRV075HF57V2K
1 ½" MPT x MPT	15	11 to 35	PRV15015V2K
	20		PRV15020V2K
	25		PRV15025V2K
	35		PRV15035V2K
	45		PRV15045V2K
	50		PRV15050V2K
	57		PRV15057V2K
REPLACEMENT PRESSURE REGULATING MODULE	15		PRVU15V2K
	20		PRVU20V2K
	25		PRVU25V2K
	35		PRVU35V2K
	45		PRVU45V2K
	50		PRVU50V2K
	57		PRVU57V2K

FPT = Female Pipe Thread
MPT = Male Pipe Thread

FILTERS
COMPARISON

	AUTOMATIC DISC FILTERS			
	COMPACT LP DISC-KLEEN	LP DISC-KLEEN		APOLLO DISC-KLEEN
	See Pages 36-37	See Pages 38-39		See Pages 40-41
Manifold Size	2"	2"	3"	4"
				
APPLICATION	Residential to Large Commercial	Residential to Large Commercial	Large Commercial	Large Commercial
WATER QUALITY	Good, Average, Poor & Very Poor	Good, Average, Poor & Very Poor	Good, Average, Poor & Very Poor	Good, Average, Poor & Very Poor
WATER SOURCE	Can Contain Algae and Other Organic Materials	Can Contain Algae and Other Organic Materials	Can Contain Algae and Other Organic Materials	Can Contain Algae and Other Organic Materials
FILTER TYPE	Disc	Disc	Disc	Disc
MAXIMUM OPERATING PRESSURE	90 psi (Std Model) 140 psi (HP Model)	90 psi (Std Model) 140 psi (HP Model)	90 psi (Std Model) 140 psi (HP Model)	90 psi (Std Model) 140 psi (HP Model)
FLOW RANGE	1 to 50 GPM (Low Flow) 1 to 80 GPM (Std Flow)	60 to 320 GPM	240 to 750 GPM	500 to 6,000+ GPM
MINIMUM PRESSURE FOR BACKFLUSH	30 psi	30 psi (Std Model) 40 psi (HP Model)	30 psi (Std Model) 40 psi (HP Model)	30 psi
MINIMUM BACKFLUSH FLOW	35 GPM (Std Model) 20 GPM (Low Flow Model)	35 GPM	70 GPM	190 GPM per pod
INCLUDES 110 VAC BACKFLUSH CONTROLLER	Yes	Yes	Yes	Yes
NUMBER OF FILTERS	1	2, 3 or 4	3, 4 or 5	3, 4, 5, 6, 7 or 8
AVAILABLE MESH RATING	80, 120, 140	80, 120, 140	80, 120, 140	80, 120, 140
ORIENTATION OF INSTALLATION	90 Degrees	Offset	Inline	Inline
FOOTPRINT	Most Compact	Most Compact	Most Compact	Compact
CAD details are available at www.netafimusa.com.				

	MANUAL DISC FILTERS*					
	See Pages 33-34					
Filter Size	3/4"	1"	1 1/2"	1 1/2" Long	2" Dual Lite	2" Dual HP
						
APPLICATION	Residential and Commercial	Residential and Commercial	Commercial	Large Commercial	Large Commercial	Large Commercial
WATER QUALITY	Good to Average	Good to Average	Good to Average	Good to Average	Good to Average	Good to Average
WATER SOURCE	City, Well, Surface and Harvested Water with low levels of sand	City, Well, Surface and Harvested Water with low levels of sand	City, Well, Surface and Harvested Water with low levels of sand	City, Well, Surface and Harvested Water with low levels of sand	City, Well, Surface and Harvested Water with low levels of sand	City, Well, Surface and Harvested Water with low levels of sand
FILTER TYPE	Disc	Disc	Disc	Disc	Disc	Disc
MAXIMUM OPERATING PRESSURE	140 psi	140 psi	140 psi	140 psi	115 psi	174 psi
FLOW RANGE	1 to 17 GPM	5 to 26 GPM	10 to 35 GPM	10 to 52 GPM	40 to 110 GPM	40 to 120 GPM
AVAILABLE MESH RATING	40, 80, 120, 140	40, 80, 120, 140	40, 80, 120, 140	40, 80, 120, 140	40, 80, 120, 140, 200	40, 80, 120, 140, 200
ORIENTATION OF INSTALLATION	Inline	Inline	Inline	Inline	Inline or 90 Degrees	Inline or 90 Degrees
CAD details are available at www.netafimusa.com.						

*Note: Automatic Disc Filters should be considered when manual cleaning is too cumbersome.

MANUAL DISC FILTERS

APPLICATIONS

- Residential
- Commercial
- Municipal
- Institutional

SPECIFICATIONS

- Maximum pressure:
  ¾", 1", 1 ½": 140 psi
  2" Dual Lite: 115 psi
  2" Dual HP: 174 psi
- Flow range:
  ¾" - 1 to 17 GPM
  1" - 5 to 26 GPM
  1 ½" - 10 to 35 GPM
  1 ½" Long - 10 to 52 GPM
  2" Dual Lite - 40 to 110 GPM
  2" Dual HP - 40 to 120 GPM

MATERIALS

- Filter body and cover: reinforced polyamide
- Disc rings: polypropylene
- O-Rings: EPDM rubber
- Clamps: stainless steel

FEATURES & BENEFITS

DISC FILTER DESIGN

Collects debris along the depth of the discs, not just at the surface like screen filters. Disc helps filtration with calcium build up.

100% THERMOPLASTIC DISCS

Corrosion resistant. Disc screens prevents element collapsing.

REPLACEMENT FILTER RINGS AVAILABLE

Color-coded for easy mesh identification.

EXTRA LARGE FILTRATION CAPACITY

Requires less cleaning.

3/4" FILTER

1" FILTER

1 1/2" FILTER

1 1/2" LONG FILTER

2" DUAL LITE FILTER

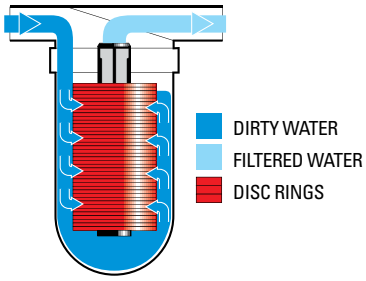
2" DUAL HP FILTER

DISC FILTER TECHNOLOGY

Grooves in the disc rings criss-cross to form a network that traps debris between and on the outside of the discs.

HOW IT WORKS

As dirty water is pumped into the filter, and pressure increases, the water compresses the disc rings together tightly. The water is then forced to flow through the grooves of the disc rings, where debris is trapped, releasing only clean water to the irrigation system.



MANUAL DISC FILTERS

FLOW RATE VS. PRESSURE LOSS

FLOW RATE (GPM)	PRESSURE LOSS (psi)					
	3/4"	1"	1 1/2"	1 1/2" LONG	2" DUAL LITE	2" DUAL HP
5	0.60	0.25				
10	2.50	0.60				
13	3.40	1.34				
17	5.87	2.10				
22		3.24	1.10			
26			1.30	1.50		
31			1.70	2.10		
35			2.30	2.50		
44				4.20	0.30	0.30
66					0.63	0.63
88					1.03	1.03
110					1.47	1.47

Losses shown are for filters with 140 mesh.

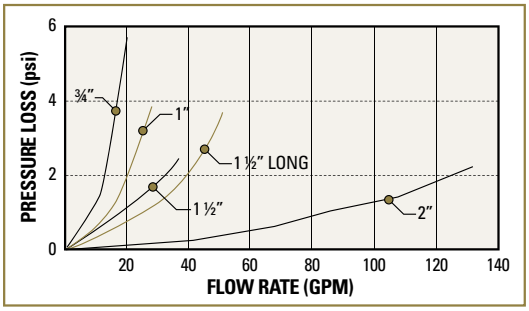
LEGEND

- River, ditch, lake or reservoir water
- Well water containing sand only
- Municipal supply

DISC FILTER RINGS

YELLOW	RED	BLACK	GREEN
80 MESH 200 MICRON	120 MESH 130 MICRON	140 MESH 115 MICRON	200 MESH 55 MICRON (2" ONLY)

FLOW RATE VS. PRESSURE LOSS



ORDERING INFORMATION

FILTER SIZE	MESH	DISC FILTER MODEL NUMBER	REPLACEMENT FILTER RINGS MODEL NUMBER
3/4"	40	DF075-040	DFR075040
	80	DF075-080	DFR075080
	120	DF075-120	DFR075120
	140	DF075-140	DFR075140
1"	40	DF100-040	DFR150040*
	80	DF100-080	DFR150080*
	120	DF100-120	DFR150120*
	140	DF100-140	DFR150140*
1 1/2"	40	DF150-040	DFR150040*
	80	DF150-080	DFR150080*
	120	DF150-120	DFR150120*
	140	DF150-140	DFR150140*
1 1/2" LONG	40	DF150S-040	DFR150L040*
	80	DF150S-080	DFR150L080*
	120	DF150S-120	DFR150L120*
	140	DF150S-140	DFR150L140*
2" DUAL LITE	40	DF2DL-040	DFR200040
	80	DF2DL-080	DFR200080
	120	DF2DL-120	DFR200120
	140	DF2DL-140	DFR200140
	200	DF2DL-200	DFR200200
2" DUAL HP	40	DF200-040	DFR200040
	80	DF200-080	DFR200080
	120	DF200-120	DFR200120
	140	DF200-140	DFR200140
	200	DF200-200	DFR200200

* Ring set and filter spine.
140 Mesh: Standard for LVCZ Kit.

MANUAL SCREEN FILTERS

APPLICATIONS

- Residential
- Commercial
- Municipal
- Institutional

SPECIFICATIONS

- Maximum pressure: 140 psi
- Flow range:
  ¾" - 1 to 13 GPM
  1" - 1 to 22 GPM
  1 ½" - 1 to 66 GPM
  2" - 1 to 89 GPM
- Filtration area:
  ¾" and 1"- 14.90 sq. in.
  1 ½" - 85.60 sq. in.
  2" - 104 sq. in.
- Mesh: 155 Micron: 90

MATERIALS

- Filter body: polypropylene
- Screen: nylon
- O-Rings: EPDM rubber

FEATURES & BENEFITS

SCREEN FILTER DESIGN

Collects debris along the nylon screen for efficient filtration.

MADE OF NON-CORROSIVE MATERIALS

Polypropylene body provides resistance to chemicals and fertilizers.

EASY MAINTENANCE

Unit easily unscrews for access to screen.

3/4" FILTER

1 1/2" FILTER

3/4" FILTER APART

1 1/2" FILTER APART

PRESSURE LOSS

FILTER SIZE 3/4"		FILTER SIZE 1"		FILTER SIZE 1 1/2"		FILTER SIZE 2"	
GPM	PSI	GPM	PSI	GPM	PSI	GPM	PSI
4.4	0.07	4.4	0.03	22.0	0.44	31.0	0.44
8.8	0.16	8.8	0.09	26.4	0.58	44.0	0.94
13.2	0.25	13.2	0.15	31.0	0.87	61.6	1.45
-	-	17.6	0.26	35.2	1.16	70.4	1.89
-	-	22.0	0.44	44.0	1.74	79.2	2.32
-	-	-	-	53.0	2.00	88.0	2.90

ORDERING INFORMATION

FILTER SIZE	MODEL NUMBER
3/4"	SF075-155
1"	SF100-155
1 1/2"	SF150-155
2"	SF200-155

2" COMPACT LP DISC-KLEEN FILTER

Automatic
Self-Cleaning
Disc Filter

APPLICATIONS

- Irrigation systems with a capacity of 1 to 80 GPM requiring clean water to operate emitters
- For areas without electricity
- When automation is desirable because manual cleaning is frequent and too cumbersome
- For residential, commercial, industrial, parks, municipal and non-potable water sources

SPECIFICATIONS

- Inlet: 2" male pipe threaded
- Outlet: 2" female pipe threaded
- Flush port: 2" female pipe threaded
- Maximum operating pressure:
  Standard and low flow models: 90 psi
  High pressure model: 140 psi
- Minimum pressure for backflush: 30 psi
- Minimum flow for backflush:
  Standard flow model: 35 GPM
  Low flow model: 20 GPM
- Minimum allowable pH: 5
- Weight: 32 lbs.

MATERIALS

- Flush valves: plastic
- Seals: nitrilo rubber, EPDM
- Filter and spine: polypropylene
- Discs: polypropylene
- Clamp and screws: stainless steel

FEATURES & BENEFITS

PROVEN DISC TECHNOLOGY DEPTH FILTRATION

Provides highly effective filtering.

MADE OF NON-CORROSIVE MATERIALS

Prevents rusting and corrosion from chemicals and weather.

COMPACT PRE-ASSEMBLED UNIT FOR EASY INSTALLATION

Fits in tight spaces, saves space. Factory assembled and tested. Delivered ready for hook-up and immediate operation.

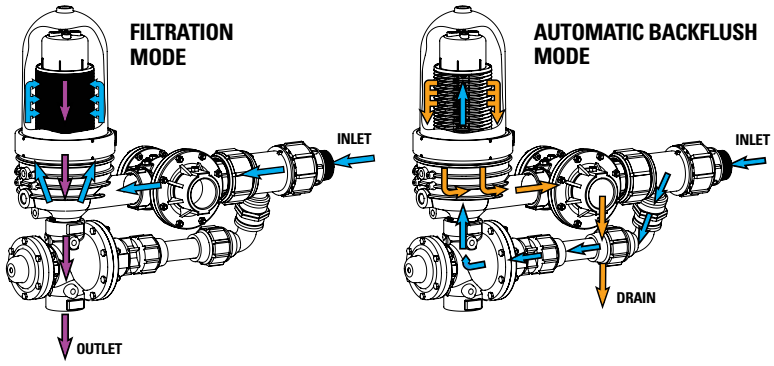
LESS BACKFLUSH TIME REQUIRED

Optimizes irrigation with a more uniform application of water.

INCLUDES BACKFLUSH CONTROLLER

AC model uses 110VAC power. DC model uses two 9 volt lithium batteries.

2" COMPACT LP DISC-KLEEN



DISC FILTER TECHNOLOGY
Grooves in the disc rings criss-cross to form a network that traps debris between and on the outside of the discs.

HOW IT WORKS
As dirty water is pumped into the filter, and pressure increases, the water compresses the disc rings together tightly. The water is then forced to flow through the grooves of the disc rings, where debris is trapped, releasing only clean water to the irrigation system.

AUTOMATIC BACKFLUSH TECHNOLOGY
The discs separate and nozzles spray the discs with clean water - inside and out, removing debris.

STANDARD FLOW MODEL MAXIMUM FLOW RATE (GPM)

WATER QUALITY*	80 & 120 MESH	140 MESH
GOOD	80	70
AVERAGE	70	60
POOR	55	50
VERY POOR	35	30

LOW FLOW MODEL MAXIMUM FLOW RATE (GPM)

WATER QUALITY*	80 & 120 MESH	140 MESH
GOOD	50	40
AVERAGE	40	30
POOR	30	20
VERY POOR	20	10

*WATER QUALITY
Good Water Quality: Municipal water supply or well water from a clean aquifer with no sand, iron or manganese.

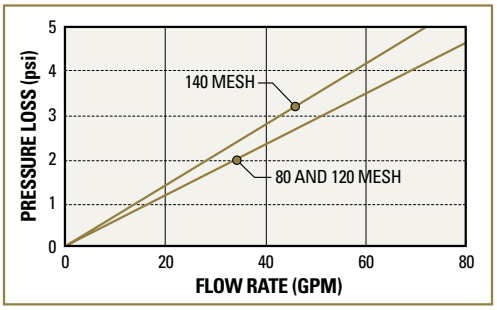
Average Water Quality: Wells with small amounts of sand (< 2 ppm) or clean surface water which includes lakes, ponds, reservoirs and canals.

Poor Water Quality: Well water with sand up to 10 ppm or surface water in hot climates with increased biological growth and no chemical treatment which includes lakes, ponds, reservoirs and canals.

Very Poor Water Quality: Well water with greater than 10 ppm of sand including rivers, muddy canals, lakes and ponds with severe run off deposits and raw municipal wastewater.

Greater than 3 ppm Sand or Silt: May require a pre-filter such as a hydrocyclone.

FLOW RATE VS. PRESSURE LOSS



FLOW RATE VS. PRESSURE LOSS

FLOW RATES (GPM)	10	20	30	40	50	60	70	80
PRESSURE LOSS (psi)	0.2	0.5	1	1.4	2	3	4	5

120 mesh when filter is in a clean state.

ORDERING INFORMATION

DESCRIPTION	MESH	AC MODEL NUMBER	DC MODEL NUMBER
STANDARD FLOW MODEL 1-80 GPM 1-90 psi	80	DFALP200-080AC	DFALP200-080DCL
	120	DFALP200-120AC	DFALP200-120DCL
	140	DFALP200-140AC	DFALP200-140DCL
LOW FLOW MODEL 1-50 GPM 1-90 psi	80	DFALPLF200-080AC	DFALPLF200-080DCL
	120	DFALPLF200-120AC	DFALPLF200-120DCL
	140	DFALPLF200-140AC	DFALPLF200-140DCL

AC Models include installed backflush controller for 110VAC power supply.
DC Models include installed backflush controller with (2) 9 volt lithium batteries and latching solenoids.

2" AND 3" LP DISC-KLEEN FILTER

Automatic
Self-Cleaning
Disc Filter

APPLICATIONS

- For surface water containing algae and other organic materials such as reservoirs, canals, rivers and wastewater applications
- Residential and multi-family developments
- Commercial landscapes, institutional parks, sports fields
- Golf courses
- Large landscape installations

SPECIFICATIONS

- 2" drain manifold inlet and outlet connections: grooved
- Backflush valve flush port: 2" MPT
- Maximum operating pressure:
  Standard model: 90 psi
  High pressure model: 140 psi
- Minimum backflush pressure required:
  Standard model: 30 psi
  High pressure model: 40 psi
- Minimum backflush flow rate:
  2" filter: 35 GPM
  3" filter: 70 GPM
- Minimum allowable pH: 5
- Inlet/outlet: 4" grooved - 2" Disc-Kleen
  6" grooved - 3" Disc-Kleen
- Includes backflush controller

MATERIALS

- Manifold: polypropylene
- Filter body: polypropylene
- Discs: polypropylene
- O-Rings and Seals: EPDM

FEATURES & BENEFITS

PROVEN DEPTH FILTRATION

Collects debris along the depth of the discs, not just at the surface like screen filters.

MADE OF NON-CORROSIVE MATERIALS

Prevents rusting and corrosion from chemicals and weather.

QUICK INSTALLATION

Factory assembled and tested. Delivered ready for hook-up and immediate operation.

SMALL FOOTPRINT

Saves valuable space.

LESS BACKFLUSH TIME REQUIRED

Optimizes irrigation scheduling for uniform watering.

2" LP DISC-KLEEN FILTER
3-UNIT

3" LP DISC-KLEEN FILTER
4-UNIT

2" AND 3" LP DISC-KLEEN

*WATER QUALITY

Good Water Quality: Municipal water supply or well water from a clean aquifer with no sand, iron or manganese.

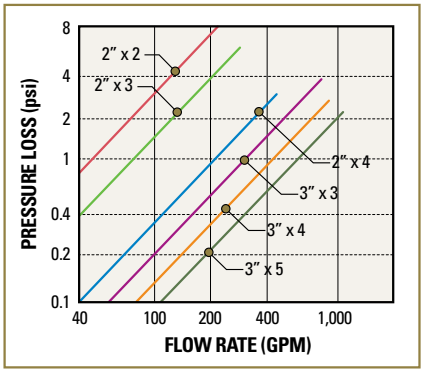
Average Water Quality: Wells with small amounts of sand (< 2 ppm) or clean surface water which includes lakes, ponds, reservoirs and canals.

Poor Water Quality: Well water with sand up to 10 ppm or surface water in hot climates with increased biological growth and no chemical treatment which includes lakes, ponds, reservoirs and canals.

Very Poor Water Quality: Well water with greater than 10 ppm of sand including rivers, muddy canals, lakes and ponds with severe run off deposits and raw municipal wastewater.

Greater than 3 ppm Sand or Silt: May require a pre-filter such as a hydrocyclone.

FLOW RATE VS. PRESSURE LOSS



120 mesh when filter is in a clean state.

ORDERING INFORMATION

NUMBER OF FILTERS	MESH	MODEL NUMBER
2" LP DISC-KLEEN		
2	80	DFALP202-080AC
	120	DFALP202-120AC
	140	DFALP202-140AC
3	80	DFALP203-080AC
	120	DFALP203-120AC
	140	DFALP203-140AC
4	80	DFALP204-080AC
	120	DFALP204-120AC
	140	DFALP204-140AC

NUMBER OF FILTERS	MESH	MODEL NUMBER
3" LP DISC-KLEEN		
3	80	DFALP303-080AC
	120	DFALP303-120AC
	140	DFALP303-140AC
4	80	DFALP304-080AC
	120	DFALP304-120AC
	140	DFALP304-140AC
5	80	DFALP305-080AC
	120	DFALP305-120AC
	140	DFALP305-140AC

AC Models include installed backflush controller for 110VAC power supply.
Solenoids are 24VAC.
Standard with PVC grooved x slip adapters and grooved couplings for connecting the filter to the main PVC line.
Backflush controllers are either 4 or 8 station depending on number of filters.
Maximum operating pressure - 90 psi.
High pressure model available for pressures between 91-140 psi.

WATER QUALITY* MAXIMUM FLOW RATE (GPM)

MESH COLOR	YELLOW	RED	BLACK
MESH SIZE	80	120	140
MICRON SIZE	200	130	115
2" X 2 FILTER			
GOOD	160	155	145
AVERAGE	150	140	130
POOR	130	120	90
VERY POOR	80	70	60
2" X 3 FILTER			
GOOD	240	230	220
AVERAGE	225	210	195
POOR	195	180	135
VERY POOR	120	105	90
2" X 4 FILTER			
GOOD	320	310	290
AVERAGE	300	280	260
POOR	260	240	180
VERY POOR	160	140	120
3" X 3 FILTER			
GOOD	480	465	435
AVERAGE	450	420	390
POOR	380	340	270
VERY POOR	240	210	180
3" X 4 FILTER			
GOOD	640	620	580
AVERAGE	600	560	500
POOR	500	450	340
VERY POOR	320	280	240
3" X 5 FILTER			
GOOD	800	775	725
AVERAGE	750	700	600
POOR	650	525	400
VERY POOR	400	350	300

APOLLO™ DISC-KLEEN FILTER

High Capacity Water Filtration System

APPLICATIONS

- For surface water containing algae and other organic materials such as reservoirs, canals, rivers and reclaimed water applications
- Residential and multi-family developments
- Commercial landscapes, institutional parks, sports fields
- Golf courses
- Large landscape installations

SPECIFICATIONS

- 4" drain manifold inlet/outlet connections: grooved
- Maximum operating pressures:
  Standard model: 90 psi
  High pressure model: 140 psi
- Minimum pressure required for backflush: 30 psi downstream of filters during backflush
- Maximum operating temperature: 158˚ F
- Minimum allowable pH: 5
- Minimum operating pressure for filtration: 20 psi
- Backflush flow rate @ 35 psi: 190 GPM
- Includes backflush controller

MATERIALS

- Manifold: high density polypropylene
- Filter body and cover: high density polypropylene
- Discs: polypropylene
- Backflush valve: nylon
- Clamps and bolts: polymeric

FEATURES & BENEFITS

PROVEN DEPTH FILTRATION

Collects debris along the depth of the discs, not just at the surface like screen filters.

MODULAR DESIGN

Provides even more portability as smaller units are assembled on-site to create larger filter units reducing installation costs.

WATER INLET AND OUTLET VERSATILITY

Multiple inlet and outlet configurations provide maximum flexibility.

MADE OF NON-CORROSIVE MATERIALS

Prevents rusting and corrosion from chemicals and weather.

QUICK INSTALLATION

Factory assembled and tested. Delivered ready for hook-up and immediate operation.

LESS BACKFLUSH TIME REQUIRED

Optimizes irrigation scheduling for uniform watering.

MORE FILTER AREA

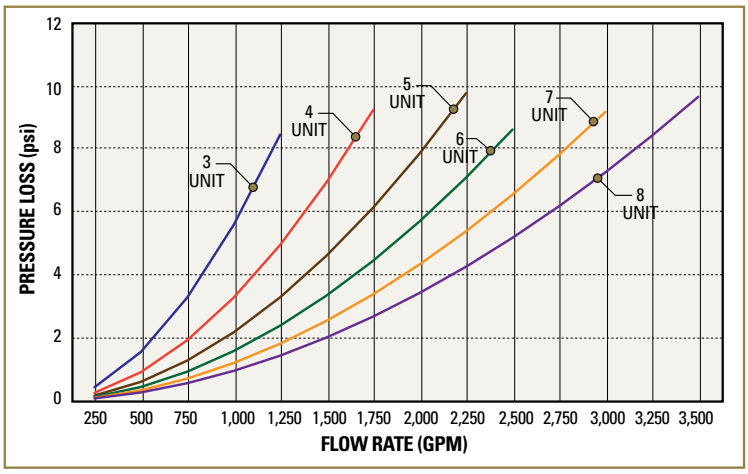
Longer filters with larger discs. Saves money by reducing total number of filter units required.

LESS PRESSURE REQUIRED FOR CLEANING

Saves money by reducing pump size and energy costs.

APOLLO™ DISC-KLEEN

FLOW RATE VS. PRESSURE LOSS



SPECIFICATIONS

SPECIFICATIONS	4 UNIT ANGLE	3 UNIT TWIN	4 UNIT TWIN	5 UNIT TWIN	6 UNIT TWIN	7 UNIT TWIN	8 UNIT TWIN
STANDARD MODEL MAX. OPERATING PRESSURE (psi)	90	90	90	90	90	90	90
HIGH PRESSURE MODEL MAX. OPERATING PRESSURE (psi)	140	140	140	140	140	140	140
FILTRATION SURFACE AREA (sq. in.)	1,625	2,435	3,245	4,055	4,865	5,675	6,485
BACKFLUSH FLOW PER UNIT (GPM at 35 psi)	95	190	190	190	190	190	190
BACKFLUSH VOLUME PER FLUSH CYCLE (GPM)	130	210	265	340	420	500	550
INLET/OUTLET MANIFOLD CONNECTION (in.)	10 FL	10 FL	10 FL	10 FL	10 FL	10 FL	10 FL

MANIFOLD CONNECTION: FL = Flanged

ORDERING INFORMATION

NUMBER OF FILTERS	MESH	MODEL NUMBER
4 ANGLE	80	DFAAP04A-080ACHP
	120	DFAAP04A-120ACHP
	140	DFAAP04A-140ACHP
3 TWIN	80	DFAAPM03-080ACHP
	120	DFAAPM03-120ACHP
	140	DFAAPM03-140ACHP
4 TWIN	80	DFAAPM04-080ACHP
	120	DFAAPM04-120ACHP
	140	DFAAPM04-140ACHP
5 TWIN	80	DFAAPM05-080ACHP
	120	DFAAPM05-120ACHP
	140	DFAAPM05-140ACHP
6 TWIN	80	DFAAPM06-080ACHP
	120	DFAAPM06-120ACHP
	140	DFAAPM06-140ACHP
7 TWIN	80	DFAAPM07-080ACHP
	120	DFAAPM07-120ACHP
	140	DFAAPM07-140ACHP
8 TWIN	80	DFAAPM08-080ACHP
	120	DFAAPM08-120ACHP
	140	DFAAPM08-140ACHP

AC Models include installed backflush controller for 110VAC power supply.
Solenoids are 24VAC - other voltages available by special order.
Backflush controllers are either 4 or 8 station depending on number of filters.
Maximum operating pressure - 90 psi.

*WATER QUALITY

Good Water Quality: Municipal water supply or well water from a clean aquifer with no sand, iron or manganese.

Average Water Quality: Wells with small amounts of sand (< 2 ppm) or clean surface water which includes lakes, ponds, reservoirs and canals.

Poor Water Quality: Well water with sand up to 10 ppm or surface water in hot climates with increased biological growth and no chemical treatment which includes lakes, ponds, reservoirs and canals.

Very Poor Water Quality: Well water with greater than 10 ppm of sand including rivers, muddy canals, lakes and ponds with severe run off deposits and raw municipal wastewater.

Greater than 3 ppm Sand or Silt: May require a pre-filter such as a hydrocyclone.

MAXIMUM FLOW RATE (GPM)

WATER QUALITY*	FLOW PER SPINE		
	80 MESH	120 MESH	140 MESH
GOOD	198	183	171
AVERAGE	183	171	156
POOR	156	144	132
VERY POOR	132	117	105

CALCULATING MAXIMUM FLOW RATE (GPM) PER FILTER UNIT:
Take the total number of spines based on the filter size and multiple that number by the Flow Per Spine based on the Water Quality and Mesh.

SPINES PER FILTER

FILTER SIZE	NUMBER OF SPINES
4 UNIT ANGLE	4
3 UNIT TWIN	6
4 UNIT TWIN	8
5 UNIT TWIN	10
6 UNIT TWIN	12
7 UNIT TWIN	14
8 UNIT TWIN	16

SERIES 80 NYLON VALVES

Reliable, Durable Control and Master Valves

APPLICATIONS

- Residential or commercial landscape irrigation applications
- For mild corrosive and mild acidity levels in the water
- For remote control, master valve and automated operations
- Reclaimed/reuse applications including municipally treated reclaimed water designated for irrigation

SPECIFICATIONS

- Recommended flow range:
  ¾" - 0.01 to 26 GPM
  1" - 0.01 to 44 GPM
  1 ½" - 0.25 to 110 GPM
  2" - 0.25 to 176 GPM
- Minimum operating pressure: 7 psi
- Maximum operating pressure: 150 psi
- Water temperature: up to 140˚ F
- 24VAC solenoid standard ± 10% voltage
- Solenoid inrush current: 0.220A
- Solenoid holding current: 0.095A
- Optional solenoids: 24VDC, 12VDC, 12VDC-latching and 120VAC
- Integral stainless steel Easyclean® filter for 1 ½" and 2" models only
- Adjustable pressure regulator option available: 1.5" and 2" Model
  Normally Closed Option: ¾" - 2"
  Normally Open Option: 1 ½" - 2"

MATERIALS

- Body, bonnet, seat and diaphragm: glass reinforced polyamide (GRP)
- Nuts, bolts and washers: stainless steel 304
- Spring: stainless steel AISI 302

FEATURES & BENEFITS

SIMPLE TO OPERATE AND MAINTAIN

Uniquely designed for simple inline installation. Minimum maintenance, maximum dependability. Captured bolts make easy service for contractors – if needed.

ROBUST FLOW CONTROL STEM AND MANUAL OVERRIDE

Flow control stem allows manual control from full closure up to maximum capacity while solenoid manual override handle enables internal bleed to manually open the valve.

RELIABLE EVEN IN HARSH CONDITIONS

Durable, corrosion free materials. Clog-free labyrinth inlet for command water makes sure the valve is suitable for reclaimed water applications.

STABLE SOLENOID

Low sensitivity to dirt and voltage fluctuations. Compatible with most continuous current controllers. Exceptionally low inrush and holding current allow the largest wire run from valve to controller in the industry.

TIGHT SEALING VALVE WITH FULLY SUPPORTED DIAPHRAGM

The Series 80 valve is suitable for high pressure application where constant upstream pressure is supplied 24/7. Series 80 valves react quickly to opening and closing.

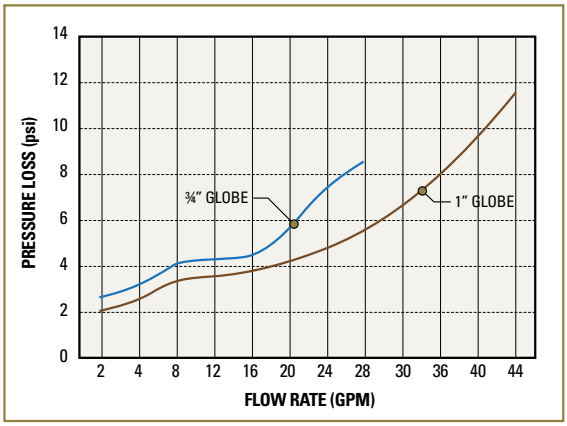
1" GLOBE ELECTRIC CONTROL VALVE

1 1/2" GLOBE MANUAL ELECTRIC MASTER OR CONTROL VALVE

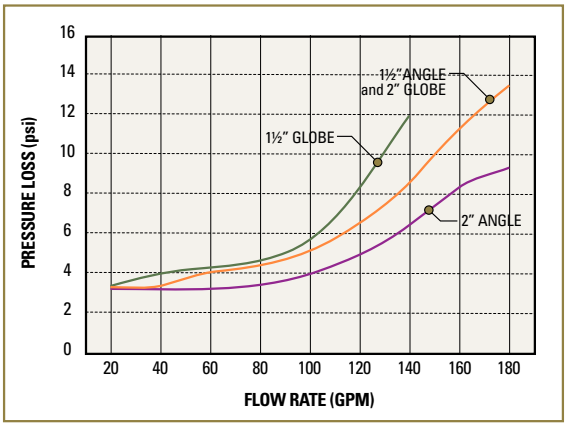
2" GLOBE PRESSURE REDUCING ELECTRIC MASTER OR CONTROL VALVE

SERIES 80 VALVES

3/4" and 1" MODELS FLOW RATE VS. PRESSURE LOSS



1 1/2" and 2" MODELS FLOW RATE VS. PRESSURE LOSS



1 1/2" and 2" MODELS FLOW RATE VS. PRESSURE LOSS

FLOW (GPM)	PRESSURE LOSS (psi)			
	1 1/2" GLOBE	1 1/2" ANGLE	2" GLOBE	2" ANGLE
20	3.3	3.3	3.3	3.3
40	4.0	3.3	3.3	3.3
60	4.3	4.0	4.0	3.3
80	4.5	4.3	4.3	3.6
100	5.5	5.0	5.0	4.1
120	8.5	6.5	6.5	5.0
140	12.0	8.5	8.5	6.5
160	-	-	11.5	8.5
180	-	-	13.5	9.5

3/4" and 1" MODELS FLOW RATE VS. PRESSURE LOSS

FLOW (GPM)	PRESSURE LOSS (psi)	
	3/4" GLOBE	1" GLOBE
2	2.5	2
4	3	2.5
8	4	3.4
12	4.1	3.5
16	4.4	3.9
20	5.5	4.1
24	7.5	4.7
28	8.5	5.4
32	-	6.5
36	-	8
40	-	9.5
44	-	11.5

CONTROLLER TO VALVE MAXIMUM WIRE LENGTHS

GAUGE	LENGTH
12	6,800'
14	4,300'
16	2,700'
18	1,700'
20	1,000'

ORDERING INFORMATION

DESCRIPTION	SIZE	MODEL NUMBER
SERIES 80* VALVES WITH STANDARD 24VAC	¾" GLOBE	LVET.75GH2
	1" GLOBE	LVET1GH2
	1 ½" GLOBE	LVET1.5GH2
	2" GLOBE	LVET2GH2
	1 ½" ANGLE	LVET1.5GH2-AN
	2" ANGLE	LVET2GH2-AN
MANUAL ELECTRIC NORMALLY CLOSED	1 ½" GLOBE	LV61METNC1.5GH3
	1 ½" ANGLE	LV61METNC1.5GH3A
	2" GLOBE	LV61METNC2GH3
	2" ANGLE	LV61METNC2GH3A
MANUAL ELECTRIC NORMALLY OPEN	1 ½" GLOBE	LV61METNO1.5GH3
	1 ½" ANGLE	LV61METNO1.5GH3A
	2" GLOBE	LV61METNO2GH3
	2" ANGLE	LV61METNO2GH3A
PRESSURE REDUCING ELECTRIC NORMALLY CLOSED	1 ½" GLOBE	LV61PRMETNC1.5GH3
	1 ½" ANGLE	LV61PRMETNC1.5GH3A
	2" GLOBE	LV61PRMETNC2GH3
	2" ANGLE	LV61PRMETNC2GH3A
PRESSURE REDUCING ELECTRIC NORMALLY OPEN	1 ½" GLOBE	LV61PRMETNO1.5GH3
	1 ½" ANGLE	LV61PRMETNO1.5GH3A
	2" GLOBE	LV61PRMETNO2GH3
	2" ANGLE	LV61PRMETNO2GH3A

* Series 80 Standard Globe Valve used in LVCZ Kits.

IRON, NYLON AND PVC VALVES

Durable
High Pressure
Valves

APPLICATIONS

- Residential, institutional, commercial, municipal and golf
- Functions:
  - Electric (Master Valve)
  - Pressure Reducing
  - Pressure Sustaining
  - Quick Relief
  - Pump Control

SPECIFICATIONS

For Electric Valves:

Volts: 24VAC standard ± 10% voltage

Optional: 24VDC, 12VDC, 12VDC-latching and 120VAC

For Iron Valves:

Diaphragm pressure range: 17 - 230 psi

For Nylon and PVC Valves:

Diaphragm pressure range: 12 - 125 psi

MATERIALS

- Nuts, Bolts and Washers: stainless steel
- Body: cast iron, nylon or PVC
- Spring: stainless steel
- Diaphragm assembly: natural rubber (EPDM and nitril available on request)

FEATURES & BENEFITS

CAST IRON MODEL

Durable, high pressure valves up to 230 psi.

NYLON AND PVC MODELS

Durable, corrosion resistant materials provide high resistance to corrosive water containing fertilizers and chemicals.

RESISTS CAVITATION

Where extreme flow velocities and high pressure differentials exist.

LOWEST FRICTION LOSS IN THE INDUSTRY

Unique design allows a straight flow pattern. The valve allows free passage in the fully open valve with minimal headloss at very high flows.

CONSTRUCTED OF MINIMAL PARTS

Structural simplicity and low maintenance.

EQUIPPED WITH DIRECT SEALING DIAPHRAGM

There are no shafts, bearings or seals to corrode and there is no wear and tear by dirty abrasive water or chemicals. The diaphragm is the only moving part.

SUPERB PRESSURE REGULATION

Valves can be used for regulating no flow to maximum flow with no need for additional throttling devices or bypass valves.

CAST IRON FLANGED VALVE
(PRESSURE REDUCING ELECTRIC)

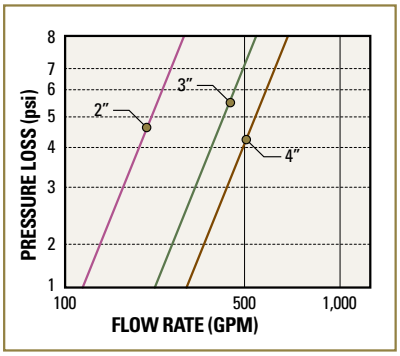
PVC SLIP VALVE
(PRESSURE REDUCING)

NYLON THREADED VALVE
(PRESSURE REDUCING ELECTRIC)

IRON, NYLON & PVC VALVES

HYDRAULIC SPECIFICATIONS	2"	3"	4"
MAXIMUM RECOMMENDED FLOW RATE CONTINUOUS VALVE (18 FEET PER SECOND - GPM)	180	400	700
NOMINAL RECOMMENDED FLOW RATE CONTINUOUS VALVE (8 FEET PER SECOND - GPM)	80	176	330
MAXIMUM RECOMMENDED FLOW RATE INTERMITTENT VALVE (49 FEET PER SECOND - GPM)	485	1,080	1,915
MINIMUM FLOW (GPM)	<1	<1	<1
FLOW FACTOR (CV)	110	200	260
OPERATING PRESSURE RANGE HIGH PRESSURE DIAPHRAGM (psi)	21-230	21-230	17-230
OPERATING PRESSURE RANGE LOW PRESSURE DIAPHRAGM (psi)	10-145	10-145	6-145

FLOW RATE VS. PRESSURE LOSS



Cv TABLE

SIZES	2"	3"	4"
FLOW FACTOR (Cv) in GPM	110	200	260

AVAILABLE MODELS

CONNECTION		THREADED			FLANGED	SLIP
MATERIAL		IRON	NYLON	PVC	IRON	PVC
AVAILABLE SIZES	2"	✓	✓			
	3"	✓		✓	✓	
	4"				✓	✓

6" - 24" Cast Iron Valves are available in flange configuration.
6" PVC Valves are also available.

ORDERING INFORMATION

DESCRIPTION	SIZE	MODEL NUMBER
IRON MANUAL ELECTRIC VALVES	2" THREADED N.C.	LV61MELNC2IT-HP
	2" THREADED N.O.	LV61MELNO2IT-HP
	3" THREADED N.C.	LV61MELNC3IT-HP
	3" THREADED N.O.	LV61MELNO3IT-HP
	3" FLANGED N.C.	LV61MELNC3IF-HP
	3" FLANGED N.O.	LV61MELNO3IF-HP
	4" FLANGED N.C.	LV6IMELNC4IF-HP
	4" FLANGED N.O.	LV6IMELNO4IF-HP
IRON PRESSURE REDUCING MANUAL ELECTRIC VALVES	2" THREADED N.C.	LV61PRMELNC2IT-HP
	2" THREADED N.O.	LV61PRMELNO2IT-HP
	3" THREADED N.C.	LV61PRMELNC3IT-HP
	3" THREADED N.O.	LV61PRMELNO3IT-HP
	3" FLANGED N.C.	LV61PRMELNC3IF-HP
	3" FLANGED N.O.	LV61PRMELNO3IF-HP
	4" FLANGED N.C.	LV61PRMELNC4IF-HP
	4" FLANGED N.O.	LV61PRMELNO4IF-HP
NYLON AND PVC MANUAL ELECTRIC VALVES	2" NYLON THREADED N.C.	LV61MELNC2PL
	2" NYLON THREADED N.O.	LV61MELNO2PL
	3" PVC THREADED N.C.	LV61MELNC3PLT
	3" PVC THREADED N.O.	LV61MELNO3PLT
	4" PVC SLIP N.C.	LV61MELNC4PLS
	4" PVC SLIP N.O.	LV61MELNO4PLS
NYLON AND PVC PRESSURE REDUCING MANUAL ELECTRIC VALVES	2" NYLON THREADED N.C.	LV61PRMELNC2PL
	2" NYLON THREADED N.O.	LV61PRMELNO2PL
	3" PVC THREADED N.C.	LV61PRMELNC3PLT
	3" PVC THREADED N.O.	LV61PRMELNO3PLT
	4" PVC SLIP N.C.	LV61PRMELNC4PLS
	4" PVC SLIP N.O.	LV61PRMELNO4PLS

N.C. = Normally Closed Valve
N.O. = Normally Open Valve

HYDROMETERS

Combination Master Valve and Water Meter/Flow Sensor

APPLICATIONS

- For commercial, institutional and sports field irrigation applications
- Ideal for retrofits
- Designed for high pressure, remote operated applications
- Water meter can communicate with irrigation controllers and central control units
- Valve can function as a remote master valve for automated operation
- Multiple pilot options: manual electric and manual electric pressure reducing

SPECIFICATIONS

- Sizes: 1 ½", 2", 3", 4", 6" and 8"
- Maximum working pressure:
  Manual Electric - 235 psi
  Pressure Reducing
  Manual Electric - 140 psi
- Body: cast iron, polyester coated
- Valve diaphragm: reinforced natural rubber
- End connections:
  1 ½" - male pipe thread
  2" - female pipe thread
  3", 4", 6" 8" - flanged
- Flanges: drilled according to ANSI specification
- Standards: EEC approval (class A)
- Installation of a continuous acting air vent before the Hydrometer is highly recommended for accurate flow readings

FEATURES & BENEFITS

GLOBE CONFIGURATION WITH BUILT-IN STRAIGHTENING VANE

Requires no straight pipe for installation - saving space.

± 2% ACCURACY ACROSS FLOW RANGES

No more false alarms.

RUGGED, HEAVY DUTY CONSTRUCTION

Cast Iron with corrosion resistant coating.

REGISTERS ARE STAINLESS STEEL/COMPOSITE ENCAPSULATED

Guaranteed against fogging due to moisture.

CONFIGURED WITH ANY COMBINATION OF PILOT CONTROL

Manual electric and pressure reducing manual electric. Normally open or normally closed.

DOUBLE-CHAMBERED VALVE

Provides quick acting and positive opening and closing.

SUB-METERING

Meter dedicated to landscape irrigation water.

PERFORMANCE DATA (GPM)

SIZE	LOWEST FLOW WITHIN ± 5% ACCURACY	LOWEST FLOW WITHIN ± 2% ACCURACY	NOMINAL FLOW WITHIN ± 2% ACCURACY	MAXIMUM FLOW WITHIN ± 2% ACCURACY
1 ½"	1.8	4.4	44	55
2"	5.3	20	66	95
3"	14	53	176	220
4"	21	79	264	380
6"	53	198	660	860
8"	97	357	1,189	1,500

HYDROMETERS

REED SWITCH (RS) REGISTER
The reed switch register is a dry contact or simple switch closure for communicating with control and monitoring equipment. Flows are totaled in U.S. Gallons based on the multiplication factors indicated on the dial face.

PHOTO DIODE HIGH FREQUENCY (PDH) REGISTER
A photo coupler sensor that provides pulse output for communicating with control and monitoring equipment. Flows are totaled in U.S. Gallons based on the multiplication factors indicated on the dial face.

DIGITAL (ER) REGISTER
Combines standard digital register features with dry pulse output for communicating with control and monitoring equipment. Rate of flow and volume readings in U.S. Gallons are clearly indicated on the LCD display.

FRICTION LOSS vs. PRESSURE LOSS (psi)

SIZE	FLOW RATE (GPM)																													
	1.8	4.4	5.3	14	20	21	53	55	79	95	97	125	150	198	220	250	300	357	380	400	500	700	860	900	950	1000	1250	1500
1 ½"	0.01	0.04	0.1	0.4	0.8	0.8	5.3	5.7																				
2"			0.02	0.2	0.3	0.4	2.3	2.5	5.1	7.4	7.7																	
3"				0.02	0.05	0.1	0.3	0.4	0.7	1.1	1.1	1.8	2.7	4.5	5.7													
4"						0.02	0.1	0.2	0.3	0.5	0.5	0.8	1.2	2.0	2.5	3.2	4.7	6.6	7.5									
6"							0.02	0.03	0.05	0.1	0.1	0.1	0.2	0.3	0.4	0.5	0.7	1.1	1.2	1.3	2.1	4.1	6.1					
8"										0.02	0.02	0.04	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.6	1.3	1.9	2.1	2.3	2.6	4.0	5.8

±2% Accuracy ±5% Accuracy

ORDERING INFORMATION

METER SIZE	REGISTER OUTPUT TYPE	PULSE PER GALLON	GALLONS PER PULSE	MODEL NUMBER			
				MANUAL ELECTRIC	PRESSURE REDUCING MANUAL ELECTRIC	PRESSURE REDUCING MANUAL ELECTRIC HIGH PRESSURE (30-130 psi)	PRESSURE REDUCING MANUAL ELECTRIC HIGH PRESSURE (100-285 psi)
1 ½"	RS	1	1	LHM15TG1-MEL	LHM15TG1-PRMEL	LHM15TG1PREHR	LHM15TG1PREHB
	PDH	187.900	0.0053	LHM15TG0053-MEL	LHM15TG0053-PRMEL	LHM15TG0053PREHR	LHM15TG0053PREHB
	ER	10	0.1	LHM15EM11AAFMEL	LHM15EM11AAFPRMEL	LHM15EM11AAFPREHR	LHM15EM11AAFPREHB
2"	RS	1	1	LHM2TG1-MEL	LHM2TG1-PRMEL	LHM2TG1PREHR	LHM2TG1PREHB
	PDH	117.000	0.0085	LHM2TG0085-MEL	LHM2TG0085-PRMEL	LHM2TG0085PREHR	LHM2TG0085PREHB
	ER	10	0.1	LHM2EM11AAFMEL	LHM2EM11AAFPRMEL	LHM2EM11AAFPREHR	LHM2EM11AAFPREHB
3"	RS	1	1	LHM3FG1-MEL	LHM3FG1-PRMEL	LHM3FG1PREHR	LHM3FG1PREHB
	PDH	48.710	0.0205	LHM3FG0205-MEL	LHM3FG0205-PRMEL	LHM3FG0205PREHR	LHM3FG0205PREHB
	ER	10	0.1	LHM3EM11AAFMEL	LHM3EM11AAFPRMEL	LHM3EM11AAFPREHR	LHM3EM11AAFPREHB
4"	RS	1	1	LHM4FG1-MEL	LHM4FG1-PRMEL	LHM4FG1PREHR	LHM4FG1PREHB
	PDH	17.933	0.0566	LHM4FG0566-MEL	LHM4FG0566-PRMEL	LHM4FG0566PREHR	LHM4FG0566PREHB
	ER	10	0.1	LHM4EM11AAFMEL	LHM4EM11AAFPRMEL	LHM4EM11AAFPREHR	LHM4EM11AAFPREHB
6"	RS	0.1	10	LHM6FG10-MEL	LHM6FG10-PRMEL	LHM6FG10PREHR	LHM6FG10PREHB
	PDH	5.747	0.1741	LHM6FG1739-MEL	LHM6FG1739-PRMEL	LHM6FG1739PREHR	LHM6FG1739PREHB
	ER	1	1	LHM6EM11AAFMEL	LHM6EM11AAFPRMEL	LHM6EM11AAFPREHR	LHM6EM11AAFPREHB
8"	RS	0.1	10	LHM8FG10-MEL	LHM8FG10-PRMEL	LHM8FG10PREHR	LHM8FG10PREHB
	PDH	3.152	0.317	LHM8FG317-MEL	LHM8FG317-PRMEL	LHM8FG317PREHR	LHM8FG317PREHB
	ER	1	1	LHM8EM11AAFMEL	LHM8EM11AAFPRMEL	LHM8EM11AAFPREHR	LHM8EM11AAFPREHB

Netafim Hydrometers are standard in a manually closed configuration.
To order a Normally Open (NO) configuration, call Netafim Customer Service at 1 (888) 638-2346 for ordering information.

OCTAVE ULTRASONIC WATER METERS

Highly Accurate With No Moving Parts

APPLICATIONS

- Commercial applications
- Communicate with irrigation controllers and measures water usage for effective water management

SPECIFICATIONS

- Plastic sizes: 1 ½" and 2"
- Metal sizes: 2", 3", 4", 6", 8", 10" and 12"
- Metal body: epoxy-coated cast iron with flange inlet and outlet
- Plastic body: reinforced polymer
- Flow range: < 1 GPM to 1,600 GPM
- Maximum working pressure: 230 psi
- Fluid temperature range: 32˚ to 122˚ F (0.1˚ to 50˚ C)
- Connections metal body: flanges ANSI ISO for AWWA connection standard
- Connections plastic: male pipe thread with ASTM couplers
- Environmental protection: IP-68, ambient operation temperature for display: -13˚ to 131˚ F (-25˚ - 55˚ C)
- Display units: multi-line, programmable 9 digit LCD display
- Output (optional): programmable single/dual open collector pulse output or externally powered 4-20 mA loop

FEATURES & BENEFITS

ACCURATE FLOW DATA WITHIN ± 1.5%

Double-beam ultrasonic sensors provide highly accurate flow data and reliable operation.

NO IMPELLER OR MOVING PARTS IN THE FLOW PATH

Ensures unrestricted low pressure loss flows.

LONG TERM PERFORMANCE

Lithium batteries provide a 10 year life expectancy.

SEALED AND TAMPER PROOF IP68 REGISTER

Programmed to log and display both forward and reverse flow. Physically reversing the meter will not decrease the forward flow totalizer.

INSTANT INFORMATION READINGS

Flow and volume information, leak detection, flow direction, output mode, battery level, alarms and errors are viewable from a multi-readout screen.

UNIQUE SERIAL NUMBER AND ACCURACY CERTIFICATE

Each meter has its own unalterable barcoded serial number and includes a certificate verifying flow accuracy.

REDUCED MAINTENANCE

Requires less maintenance for wear-prone parts commonly found in other meters.

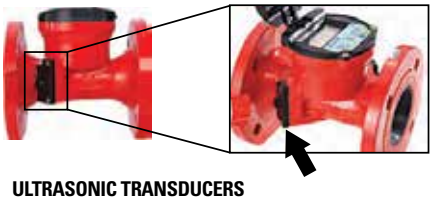
1 ½" AND 2"
(PLASTIC BODY)

2" TO 12"
(METAL BODY)

OCTAVE WATER METERS

HOW OCTAVE WORKS

The Octave's measurement method is based on ultrasonic, transit-time, dual-beam sensors that determines the length of time it takes an ultrasonic wave to travel the distance between the two sensors located in the meter's body. The sensors function as both sender and receiver, each one alternating these functions so that the ultrasonic wave travels both with and against the direction of the flow. Because the ultrasonic wave travels slower against the flow than with the flow, the time difference of the two waves allows the meter to determine the flow rate.

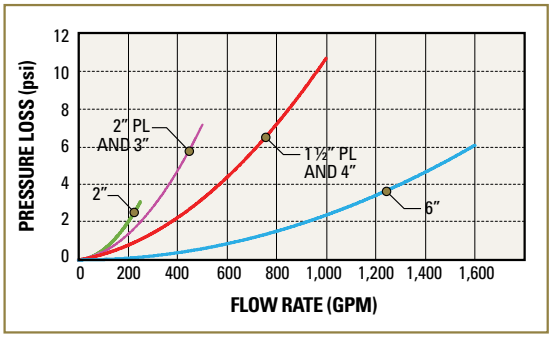


ULTRASONIC TRANSDUCERS
Double beam ultrasonic sensors

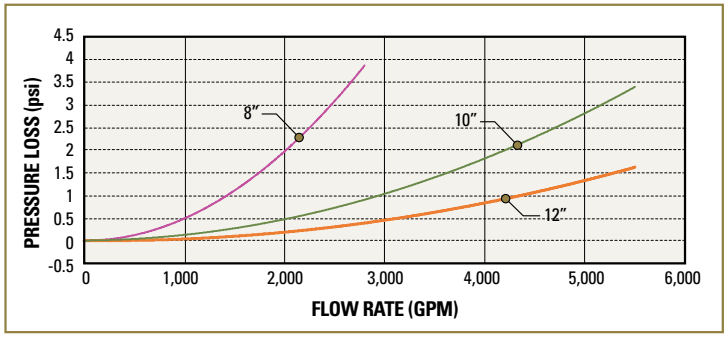
PERFORMANCE DATA

SIZE	EXTENDED LOW FLOW WITHIN ± 5% (GPM)	NOMINAL FLOW RANGE WITHIN ± 5% (GPM)	SAFE MAX FLOW RATE (GPM)	HEADLOSS MAX FLOW RATE (psi)
1 1/2" PL	0.70	1.15 - 220	220	3.1
2" PL	0.35	0.50 - 220	250	3.1
2"	0.25	1 - 200	250	3.1
3"	0.50	1 - 500	400	6.9
4"	0.75	1 - 1,000	650	10.25
6"	2.0	3 - 1,400	1,500	6.05
8"	3.5	4.5 - 2,250	3,000	3.95
10"	8.8	14 - 5,500	5,500	1.75
12"	8.8	15 - 5,500	5,500	3.4

FLOW RATE VS. PRESSURE LOSS



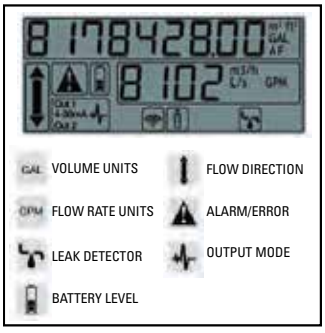
FLOW RATE VS. PRESSURE LOSS



OCTAVE PROGRAMMING AND DIGITAL DISPLAY

Multi-line digital LCD readout display provides immediate reporting and visual indicators for critical conditions. The 9 digit display is easy to read at a glance. Each Octave meter will be pre-programmed before shipment for an instantaneous flow rate in gallons per minute (GPM) and volume totalizer units (Gallons).

NOTE: Programming software is not available to the end user. Once the meter is programmed by Netafim prior to shipment, it can only be reset by Netafim.



ORDERING INFORMATION

LS360CT SIZE **GAL** OUTPUT

SIZE
1 1/2" PL = 15TP
2" PL = 02TP
2" = 02
3" = 03
4" = 04
6" = 06
8" = 08
10" = 10
12" = 12

OUTPUT	
NO OUTPUT (METER DISPLAY ONLY)	= NO
0.1 GALLONS PER PULSE	= 0.1
1.0 GALLONS PER PULSE	= 1.0
10 GALLONS PER PULSE	= 10
100 GALLONS PER PULSE	= 100
ANALOG OUTPUT 420mA	= 420

ORDERING EXAMPLE:
LS360CT04GAL0.1
4" Octave water meter, volume in gallons, flow rate in gallons per minute, pulse output 0.1 gallons per pulse

WATER METERS

Most Accurate in the Industry

APPLICATIONS

- Use smaller sized meters as sub-meter for residential or commercial applications
- Communicate with irrigation controllers and measures water usage for effective water management

SPECIFICATIONS

- Sizes: ¾" to 6"
- Maximum working pressure:
  ¾", 1" and 1 ½": 140 psi
  2" to 6": 230 psi
- Maximum water liquid temperature:
  ¾", 1" and 1 ½": 122˚ F
  2": 131˚ F
  3" to 6": 140˚ F
- Available bodies: metal (corrosion proof copper alloy) or composite (plastic)
- Available with Reed Switch, Photo Diode or Electronic Digital registers
- Installation of a continuous acting air vent before the water meter is highly recommended for accurate flow readings

FEATURES & BENEFITS

ONLY ONE MOVING PART - THE IMPELLER - IN CONTACT WITH THE WATER

For minimum wear and utmost reliability.

MAGNETIC DRIVEN SEALED REGISTERS ARE STAINLESS STEEL/COMPOSITE ENCAPSULATED

Guaranteed against fogging due to moisture.

ACCURATE OVER A WIDE RANGE OF FLOWS

For flexible and efficient water management.

INDUSTRY'S LONGEST WARRANTY

Three years on the metering components (register and metering assembly) and five years on the meter body.

¾" AND 1"
(PLASTIC BODY)

¾", 1" AND 1 ½"
(METAL BODY)

2"

3", 4" AND 6"

Schumacher IRRIGATION

Your Irrigation Superstore
Email: irrigate@schumacherirrigation.com
www.schumacherirrigation.com

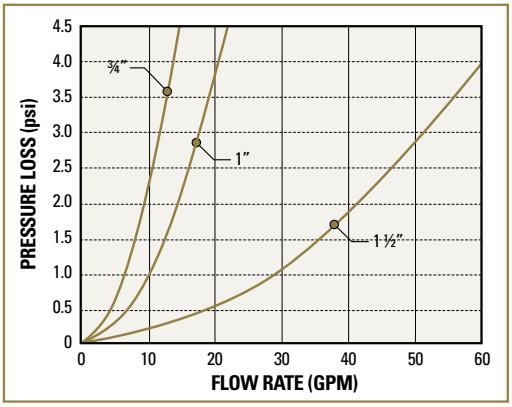
Toll Free: 800-246-3685
Phone: 402-246-3685
Fax: 402-246-2072

WATER METERS

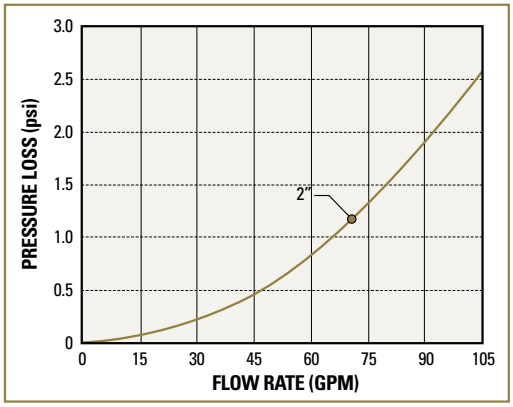
PERFORMANCE DATA (GPM)

SIZE	LOWEST FLOW WITHIN ± 5% ACCURACY	LOWEST FLOW WITHIN ± 2% ACCURACY	NOMINAL FLOW WITHIN ± 2% ACCURACY	MAXIMUM FLOW WITHIN ± 2% ACCURACY
¾″	0.2	0.9	11	14
1″	0.3	1.2	15.4	20
1 ½″	0.9	3.5	44	55
2″	2.0	8.8	88	110
3″	2.0	4	528	660
4″	4.0	6	1,013	1,266
6″	11	15	1,145	1,431

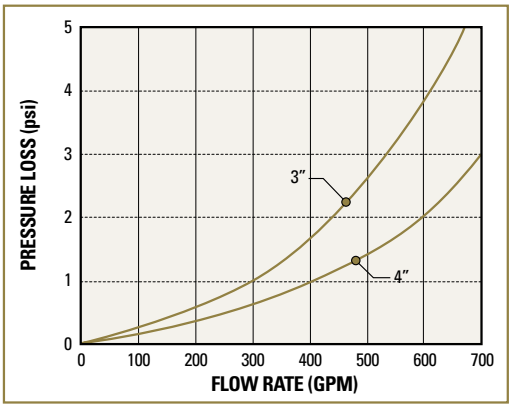
FLOW RATE VS. PRESSURE LOSS



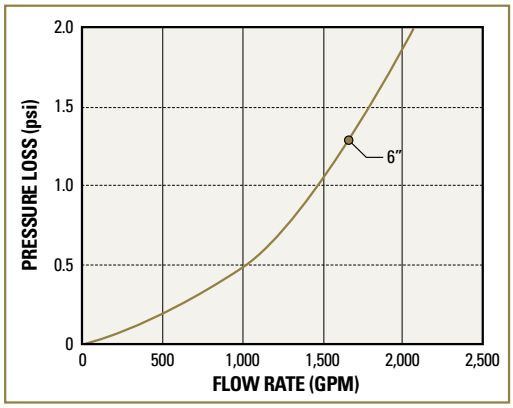
FLOW RATE VS. PRESSURE LOSS



FLOW RATE VS. PRESSURE LOSS



FLOW RATE VS. PRESSURE LOSS



WATER METERS

REED SWITCH REGISTER (RS)
The reed switch register is a dry contact or simple switch closure for communicating with control and monitoring equipment. Flows are totaled in U.S. Gallons based on the multiplication factors indicated on the dial face.

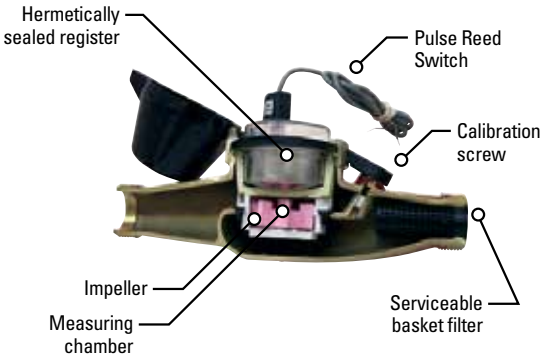


PHOTO DIODE REGISTER (PD)
A photo coupler sensor that provides pulse output for communicating with control and monitoring equipment. Flows are totaled in U.S. Gallons based on the multiplication factors indicated on the dial face.

DIGITAL (ER) REGISTER
Combines standard digital register features with dry pulse output for communicating with control and monitoring equipment. Rate of flow and volume readings in U.S. Gallons are clearly displayed on the LCD display.

ORDERING INFORMATION

BODY MATERIAL	SIZE	REGISTER OUTPUT TYPE	GALLONS PER PULSE	MODEL NUMBER
PLASTIC	¾″	RS	0.1	WM-075-0.1-RS-P
PLASTIC	¾″	RS	1.0	WM-075-1.0-RS-P
PLASTIC	1″	RS	1.0	WM-100-1.0-RS-P
PLASTIC	¾″	PD	.0015	WM-075-.0015-PD-P
PLASTIC	1″	PD	.0021	WM-100-.0021-PD-P
PLASTIC	¾″	ER	0.1	WM-075-0.1-ER-P
PLASTIC	1″	ER	0.1	WM-100-0.1-ER-P
METAL	¾″	RS	0.1	WM-075-0.1-RS-M
METAL	¾″	RS	1.0	WM-075-1.0-RS-M
METAL	1″	RS	1.0	WM-100-1.0-RS-M
METAL	1 ½″	RS	1.0	WM-150-1.0-RS
METAL	2″	RS	10	WM-200-10-RS
METAL	3″	RS	10	WMW-300-10-RS
METAL	4″	RS	10	WMW-400-10-RS
METAL	6″	RS	100	WMW-600-100-RS
METAL	¾″	PD	.0015	WM-075-.0015-PD-M
METAL	1″	PD	.0021	WM-100-.0021-PD-M
METAL	1 ½″	PD	.0074	WM-150-.0074-PD
METAL	2″	PD	1.0	WM-200-1.0-PD
METAL	¾″	ER	0.1	WM-075-0.1-ER-M
METAL	1″	ER	0.1	WM-100-0.1-ER-M
METAL	1 ½″	ER	0.1	WM-150-0.1-ER
METAL	2″	ER	1.0	WM-200-1.0-ER
METAL	3″	ER	1.0	WMW-300-1.0-ER
METAL	4″	ER	1.0	WMW-400-1.0-ER
METAL	6″	ER	10	WMW-600-10-ER

WATER METERS
STRAIGHT PIPE INSTALLATION

REQUIRED FOR WATER METERS 2" AND LARGER

When water flows through a pipe, any transition through a fitting, elbow, or change in pipe size causes turbulence in the water. In order to eliminate water turbulence, some water meters require straight pipe before and after the water meter. Straight pipe installation refers to the length of straight pipe needed before (upstream of the water meter) and after (downstream of the water meter).

The ¾", 1" and 1 ½" water meters do not require straight pipe installation, but a 5 x diameter before and 2 x diameter straight pipe installation after the meter is recommended. **(Diameter = Meter Size)**

The 2" water meter requires straight pipe installation of 10 x diameter before and 5 x diameter straight pipe installation after the meter.

The 3", 4" and 6" water meters require straight pipe installation of 5 x diameter before and 2 x diameter straight pipe installation after the meter.

Continuous acting air vents are used to remove air from the system for accurate metering. Proper air vent selection and placement within the system is critical.

CONFIGURING STRAIGHT PIPE INSTALLATION EXAMPLE BELOW:

Water Meter: 2"

Upstream: 10 x 2" diameter meter = 20" (10 x D)
20" of straight pipe upstream of the water meter

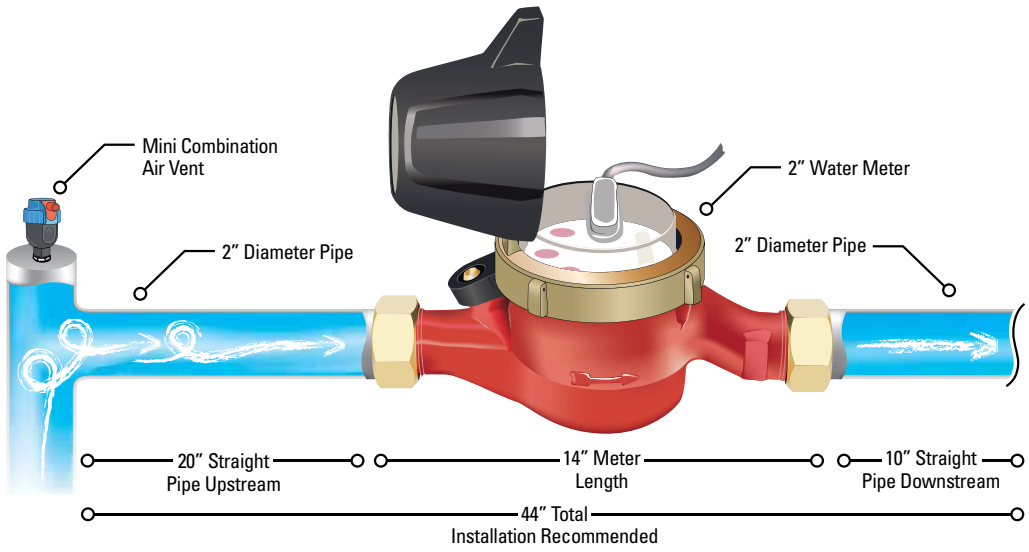
Downstream: 5 x 2" diameter meter = 10" (5 x D)
10" of straight pipe downstream of the water meter

Meter Length: 14"

Total: 44" total installation recommended

STRAIGHT PIPE INSTALLATION REQUIREMENTS
(10 X D AND 5 X D - 2" SIZE)
(5 X D AND 2 X D - 3", 4" AND 6" SIZE)

SIZE	UPSTREAM DISTANCE	DOWNSTREAM DISTANCE	METER LENGTH	TOTAL REQUIREMENT
2"	20"	10"	14"	44"
3"	15"	6"	9"	30"
4"	20"	8"	10"	38"
6"	30"	12"	12"	54"



FLOW COMPUTER

Real Time Remote Flow Viewing

APPLICATIONS

- Remote display for reading difficult to access meters
- Data recording
- Output to: fertilizer pumps, variable speed drive pumps, Netafim and other manufacturers compatible controllers

SPECIFICATIONS

- Operating temperature: -4˚ F to 158˚ F
- Total/flow units available:
  Liters, gallons, cubic feet, acre inch and acre feet
- Power supply:
  12VDC external power supply (not included)
- Inputs:
  Input signal from Netafim meters - reed switch (RS) or open drain such as the Netafim Octave meter
- Outputs:
  - Open drain output signal
  - Scaled pulse output
  - Alarm output (high flow and low flow)
  - Periodic days limit output

FEATURES & BENEFITS

NEXT GENERATION NETAFIM FLOW COMPUTER

Includes new user friendly programming with large seven digit LCD display and easy to read icons.

TOTAL/FLOW MONITOR AND ACCUMULATOR

Flow can be shown per second, minute, hour or day with three total volume readings - lifetime, periodic days and resettable.

MODIFIABLE K-FACTOR

For attaching any flow sensor with any pulse:volume ratio for communication between Netafim Water Meters or Hydrometers and a wide range of equipment including fertilizer pumps, data recorders and controllers.

MULTIPLE OPTIONS FOR SETTING OUTPUTS

Outputs can be set as flow rate alarm (high or low), total limiter for 1-99 days, or programmable pulse per volume ratio output (used for fertilizer pump).

WEATHER PROOF ENCLOSURE (NEMA 4)

Wall mountable, basic water-tight (weather proof) and corrosion resistant enclosure.

ORDERING INFORMATION

DESCRIPTION	MODEL NUMBER
NETAFIM FLOW COMPUTER, 12VDC POWERED	NFC200

NETAFIM LANDSCAPE CONTROLLERS (NLC)

ORDERING GUIDELINES

ORDERING MATRIX

NLC - TYPE - STATION COUNT - CABINET/PEDESTAL - COMMUNICATION - HYBRID ONLY - OUTPUT

OPTIONS

TYPE
SP = Conventional Panel
SH = Conventional Hybrid Panel
DP = Decoder *

* Only available with 100 stations

STATION COUNT *
012 = 12 Stations
018 = 18 Stations
025 = 25 Stations
037 = 37 Stations
050 = 50 Stations
075 = 75 Stations
100 = 100 Stations

* Order appropriate Cabinet/Pedestal size for Station Count

CABINET/PEDESTAL
P12 = 12" x 12" x 6" Cabinet (SP up to 25 Stations and DP up to 100 Stations)
C12 = 12" x 12" x 6" Cabinet (SP and SH up to 25 Stations)
C20 = 12" x 20" x 6" Cabinet (SP and SH 26-50 Stations)
PE1 = 2 Piece Top Entry SS Lite Pedestal (1-100 Stations)
PE3 = 1 Piece Top Entry SS HD Pedestal (1-100 Stations)
NON = No Cabinet or Pedestal

NLC Extension panel available (NLCEXTP)
P12 is ASA Polycarbonate
C12 and C20 are Stainless Steel

COMMUNICATION
W = Cellular
L = LAN
N = None

HYBRID ONLY OPTIONS *
06 = Up to 6 Valves, MV, Flow Sensor
24 = Up to 24 Valves, MV, Flow Sensor
NO = Not Hybrid Type

* Only available with Type SH

OUTPUT TERMINAL *
Y = 25 Station Output Terminal Strip
N = No Output

* Only available with Type SP or SH

25 Station Output Terminal Strip (NLCCONHD)

ORDERING EXAMPLE:
NLCSP-012-C12-N-NO-N
Model Number **NLCSP012-C12NNON**
Netafim Landscape Controller NLC-100S, Conventional Panel, 12 Stations, 12" x 12" x 6" Cabinet, No Communication, Not Hybrid Type, No Output Terminal

TOTAL CYCLE MANAGEMENT

TOTAL CYCLE MANAGEMENT WITH NETAFIM LANDSCAPE CONTROLLERS

Netafim's Total Cycle Management solution uses weather stations in combination with soil moisture sensors to provide the most accurate data about your site's irrigation needs. Accurate data means accurate irrigation, so you can use only the water you need, conserving water and promoting plant health.

Before Netafim's Total Cycle Management, irrigation systems provided water monitoring via soil or climate data - not both. But each of these methods has drawbacks when used alone. For example, soil moisture sensors and probes may not be practical for projects with inconsistent soil types. Weather stations, on the other hand, do not measure the soil's true water content, watering based on climate conditions when the soil could be saturated. By combining these two technologies - along with Netafim Landscape Controllers - Total Cycle Management provides irrigation scheduling you can trust.

NETAFIM LANDSCAPE CONTROLLER

Decoder Based 2-Wire Controller with Integrated Diagnostics and Flexibility

NLC-100D DECODER

APPLICATIONS

- For commercial and residential applications
- For recreational applications such as sports fields, parks and arenas
- Nurseries and greenhouses

SPECIFICATIONS

- Stations (valves): 1 - 100
- Electrical input: 115VAC, 50VA
  Electrical output: 24VAC
- Maximum simultaneous active valves: 12
- Booster pumps: 2 (1 per program)
- Built-in lightning protection
- Maximum wire lengths: *
  16,300' with #14/2
  10,200' with #16/2
- Cabinet: NEMA 4 rated locking plastic cabinet or stainless steel cabinet with Class 2 internal transformer
- Diagnostics:
  Decoder Test - pass/fail
  Short Test - checks line condition
  Line Survey - displays 2-Wire voltage and current
- Flow sensing capable

* When running 2 valves simultaneously.

QUALIFIES FOR USE ON **LEED PROJECTS**

NETAFIM LANDSCAPE CONTROLLER INSTALLATION VIDEOS AVAILABLE AT
WWW.YOUTUBE.COM/NETAFIMUSA

FEATURES & BENEFITS

PROGRAMMABLE LINE DECODER

Decoder is easily programmed by the user with specific station identifications connected anywhere along the 2-Wire path to turn on almost any 24VAC solenoid valve.

SUPPORTS 1 TO 100 VALVES

Operate up to 100 valves with one 2-Wire path, connecting the valves in a series.

INTEGRATED DIAGNOSTICS

Controller tests for decoder operation as well as 2-Wire path conditions.

MANAGE REMOTELY

Control irrigation programs and review daily logs and schedules for multiple sites from any web-based computer (service contract required).

INSTANT TROUBLESHOOTING

Built-in monitors and alarms send automatic notifications pinpointing the exact nature of the problem (service contract required).

EASY TO EXPAND

Adapts to your growing system by allowing the addition or modification of valves with no need for costly rewiring or upgrades.

ENERGY EFFICIENT

The 2-Wire cable carries both power and signal to control each valve using 1/10th the power of a conventional system.

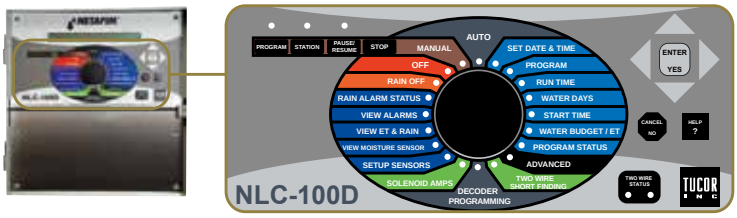
WaterSense Labeled EPA Criteria
Certified by ICC-ES

ADVANCED FEATURES

MIST MANAGER	Valve operations controllable in 1 second increments
FLOSTACK™	Program stacking based on flow for up to 10 simultaneous programs
REALNET	Real-time, internet based water management via GSM or LAN
INTELLISET	Smart irrigation using a host of ET-based capabilities
FLOGUARD	Alarm and control option based on flow monitoring

NLC-100D DECODER

NLC-100D DECODER CONTROLLER FACE PLATE



OPERATING FEATURES

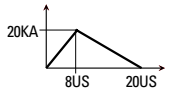
PROGRAMS	10 + 1 Test Programs, 10 Concurrent
START TIMES	12 per Program
CALENDAR	14 days or Odd/Even
STATION RUN	0-999 minutes in 1 second increments
TIMES	(<4 minutes) or 10 second increments (4-999 minutes)
WATER BUDGET	0-250% at 1% increments
PROGRAM MODES	Active and Passive
START METHODS	Auto, Manual by Program or Station
DISPLAY	Monitors active programs, run times, line conditions, alarms
DECODERS	Addressed and tested at controller

DECODER SPECIFICATIONS

LEAD LENGTH	11"
DIMENSIONS	1.5" X 1.4" X 2.3"

SURGE PROTECTOR SPECIFICATIONS

NORMAL SPARK OVER VOLTAGE	230V
MAX. SPARK OVER VOLTAGE	450V
MAX. CURRENT	



Surge protector must be installed and grounded every 500' and at the end of the wire run. Resistance of the 2-Wire to ground must be 50Ω or less.

DIMENSIONS & WEIGHT

LENGTH	12"
DEPTH	6"
HEIGHT	12"
WEIGHT (LBS.)	15

TUCOR WIRE SPECIFICATIONS

INSULATION	POLYVINYLCHLORIDE
JACKET	POLYETHYLENE
SIZES	12-16 AWG
COLORS	RED, GREEN, ORANGE, BLUE
SPOOL LENGTHS	500', 1,000', 2,500'

Some wire colors and spool lengths are special order.

TUCOR WIRE LENGTHS

NUMBER OF SIMULTANEOUS PROGRAMS	VALVES EVENLY DISTRIBUTED ALONG 2-WIRE (FT.) AWG 18	AWG 16	AWG 14
1	7,000	11,000	17,800
2	6,400	10,200	16,300
3	5,500	8,800	14,100
4	4,900	7,800	12,500
5	4,400	7,000	11,200
6	4,000	6,300	10,100
7	3,600	5,800	9,200
8	3,300	5,300	8,500
9	3,100	4,900	7,800
10	2,800	4,600	7,300
10 + 1 MANUAL	2,700	4,300	6,800
10 + 2 MANUAL	2,500	4,000	6,400

DECODERS, SURGE PROTECTION AND WIRES

The decoder is easily programmed with a specific station ID, then connected anywhere along the 2-Wire path to enable valve activation. The decoder energizes almost any 24VAC solenoid and can be reprogrammed with a different ID when desired. Wire options:

- NLC Decoder (Blue: NLC100D) required.
- TUCOR WIRE - is the preferred means of connecting the field decoders to the controller. Tucor wire is designed expressly to ensure a secure, water-tight electrical pathway.
  NOTE: Tucor wire is not supplied by Netafim.
- NETAFIM SINGLENET CABLE - two low capacitance wires and a drain wire, 16 AWG, pre-packaged as a single cable inside a polyethylene sheath.

Field disruptions due to lightning are minimized by the use of the NLCSP100 surge protector which safely absorbs 2-Wire voltage surges adding substantial protection to the 2-Wire path.

ORDERING MATRIX

OPTIONS

NLCDP - 100 - CABINET/PEDESTAL - COMMUNICATION - NO - N

DECODER PANEL	STATION COUNT	CABINET/PEDESTAL	COMMUNICATION	NOT HYBRID	NO OUTPUT

CABINET/PEDESTAL

- **P12** = 12" x 12" x 6" Cabinet (Up to 100 stations)
- **C12** = 12" x 12" x 6" Cabinet (Up to 25 stations)
- **C20** = 12" x 20" x 6" Cabinet (Over 25 stations)
- **PE1** = 2 Piece Top Entry SS Lite Pedestal (1-100 stations)
- **PE3** = 1 Piece Top Entry SS HD Pedestal (1-100 stations)
- **NON** = No Cabinet or Pedestal

COMMUNICATION

- **W** = Cellular
- **L** = LAN
- **N** = None

ORDERING EXAMPLE:

NLCDP-100-P12-N-NON = Model Number **NLCDP100-C12NNON**
Netafim Landscape Controller NLC-100D, Decoder Controller, 100 Stations, 12" x 12" x 6" Cabinet, No Communication, Not Hybrid, No Output Terminal

NETAFIM LANDSCAPE CONTROLLER

Stand Alone Controller for Converting Conventional Systems to Remote Management

NLC-100S CONVENTIONAL

APPLICATIONS

- For commercial and residential applications
- For recreational applications such as sports fields, parks and arenas
- Remote management from any web-based computer
- Nurseries and greenhouses

SPECIFICATIONS

- Stations (valves): 1 - 100*
- Electrical input: 115VAC, 50VA
  Electrical output: 24VAC
- Maximum simultaneous active valves: 6
- Master valves: 1, 10 second stop delay
- Booster pumps: 2, 10 second stop delay
- Built-in lightning protection
- Valve output: 24VAC, 1.0 A per station maximum, 1.5 A total maximum
- Cabinet: wall mounted NEMA 4 rated locking plastic or stainless steel cabinet with internal Class 2 transformer
- Flow sensing capable

* Stations from 26-50 require NLCCAB20. Stations from 51-75 and 76-100 each require an NLCEXTP.

QUALIFIES FOR USE ON **LEED PROJECTS**

NETAFIM LANDSCAPE CONTROLLER INSTALLATION VIDEOS AVAILABLE AT **WWW.YOUTUBE.COM/NETAFIMUSA**

FEATURES & BENEFITS

SIMPLE TO RETROFIT

Expressly designed to convert a conventional system to a remote management system with a wealth of controller capabilities.

PATENTED TOTAL CYCLE MANAGEMENT

Totally integrated system utilizing a weather station, tipping rain bucket and up to 10 soil moisture sensors.

MANAGE REMOTELY

Control irrigation programs and review daily logs and schedules for multiple sites from any web-based computer (service contract required).

INSTANT TROUBLESHOOTING

Built-in monitors and alarms send automatic notifications pinpointing the exact nature of the problem (service contract required).

Certified by ICC-ES

ADVANCED FEATURES

MIST MANAGER	Valve operations controllable in 1 second increments
FLOSTACK™	Program stacking based on flow for up to 10 simultaneous programs
REALNET	Real-time, internet based water management via GSM or LAN
INTELLISET	Smart irrigation using a host of ET-based capabilities
FLOGUARD	Alarm and control option based on flow monitoring

NLC-100S CONVENTIONAL

NLC-100S CONVENTIONAL CONTROLLER FACE PLATE

OPERATING FEATURES

PROGRAMS	10 + 1 Test Programs
CONCURRENT PROGRAMS	10
START TIMES	12 per Program, 1-99 repeats per start
CALENDAR	14 days or Odd/Even
STATION RUN TIMES	0-999 minutes in 1 second increments (<4 minutes) or 10 second increments (4-999 minutes)
WATER BUDGET	0-250% at 1% increments
PROGRAM MODES	Active and Passive
START METHODS	Auto, Manual by Program, Manual by Station
DISPLAY	Monitors active programs, run times and alarms

REMOTE MANAGEMENT

- Via the internet when equipped with GSM or LAN
- Direct virtual screen control
- Real time web pages via Cycle Manager software
- Remote App for all smart phone and tablet platforms

CONSERVATION FEATURES

- Rain Sensor Terminals/Pulse, N/O, N/C
- Flow Sensor inputs at the Controller with:
  - Alarms: High, Unscheduled, % Deviation, Main Pump Failure with adjustable delay
  - Learn flow per station
- Moisture Sensors up to 10 per Controller
  - Monitoring by % volume and inches
  - Allow and inhibit per program
  - Automatically adjust ET based programs
- Multiple ET sources
  - Historic ET by city
  - Local on-site weather station
  - Server based data

HYDROMETER FLOW SENSOR

The perfect solution for retrofitting - contains both a master valve and flow sensor in one sturdy package.

- No straight pipe requirements upstream or downstream for installation in tight places.
- Real-time flow display based on pulses per gallon.
- Photo diode option for high frequency output, even at low flows. Powered by the controller or by a sensor decoder.
- Provides +/- 2% accuracy across a wide range of flows.
- Also used with NLC-100S, NLC-100D and NLC-3D systems.

DIMENSIONS & WEIGHT

LENGTH	12"
DEPTH	6"
HEIGHT	12"
WEIGHT (LBS.)	15

ORDERING MATRIX

NLCSP - **STATION COUNT** - **CABINET/PEDESTAL** - **COMMUNICATION** - **NO** - **OUTPUT**

OPTIONS

CONVENTIONAL PANEL

STATION COUNT *
012 = 12 Stations
018 = 18 Stations
025 = 25 Stations
037 = 37 Stations
050 = 50 Stations
075 = 75 Stations
100 = 100 Stations

* Order appropriate Cabinet size (P12, C12 or C20) for Station Count

CABINET/PEDESTAL
P12 = 12" x 12" x 6" Cabinet (Up to 25 stations)
C12 = 12" x 12" x 6" Cabinet (Up to 25 stations)
C20 = 12" x 20" x 6" Cabinet (Over 25 stations)
PE1 = 2 Piece Top Entry SS Lite Pedestal (1-100 stations)
PE3 = 1 Piece Top Entry SS HD Pedestal (1-100 stations)
NON = No Cabinet or Pedestal

COMMUNICATION
W = Cellular
L = LAN
N = None

NOT HYBRID

OUTPUT TERMINAL
Y = Heavy Duty Output Lightning Strip
N = No Output

ORDERING EXAMPLE:

NLCSP-012-C12-N-NO-N = Model Number **NLCSP012-C12NNON**
Netafim Landscape Controller NLC-100S, Conventional Panel, 12 Stations, 12" x 12" x 6" Cabinet, No Communication, Not Hybrid, No Output Terminal

NETAFIM LANDSCAPE CONTROLLER

Stand Alone Controller Includes Hybrid Technology with Master Valve and Sensor Inputs

NLC-100S HYBRID

APPLICATIONS

- Commercial and HOA applications with battery operated controllers
- Retrofit applications requiring flow sensors
- Applications that require the rezoning or expansion of existing systems

SPECIFICATIONS

CONTROLLER

- Stations (valves): 12 - 100
- Electrical input: 115VAC, 50VA
  Electrical output: 24VAC
- Maximum simultaneous active valves: 6
- Master valves: 1, 10 sec. stop delay
- Booster pumps: 2, 10 sec. stop delay
- Built-in lightning protection
- Valve output: 24VAC, 1.0 A per station maximum, 1.5 A total maximum
- Cabinet: wall mounted NEMA 3 rated locking metal cabinet with internal class 2 transformer

SPECIFICATIONS

HYBRID MODULE

- Stations (valves): 6 or 24
  Up to 48 with additional hybrid board
- Electrical input: 24VAC sourced from current controller
- Includes (1) master valve and (1) flow sensor input
- Up to 3 stations simultaneously
- 2-Wire distances up to 8,000'
- Program decoders at hybrid controller or with the optional programmer
- Requirements:
  - Decoder for converted stations and master valve
  - Sensor decoder for flow sensor

FEATURES & BENEFITS

MASTER VALVE AND FLOW METER INPUTS

Add a master valve and flow meter to the system utilizing the existing valve's common and control wires.

ADD MULTIPLE VALVES

Ability to add multiple valves to an existing system from any existing valve location.

CONVERT TO A 2-WIRE SYSTEM

Enjoy all the advantages of a 2-Wire decoder system utilizing the existing control wires.

MANAGE REMOTELY

Control irrigation programs and review daily logs and schedules for multiple sites from any web-based computer (service contract required).

COMBINE MULTIPLE CONTROLLERS

Combining multiple controllers into one minimizes power drops and recurring server fees.

WaterSense Meets EPA Criteria
Certified by ICC-ES

HYDROMETER FLOW SENSOR

The perfect solution for retrofitting - contains both a master valve and flow sensor in one sturdy package.

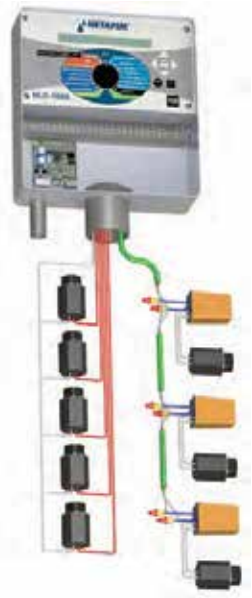
- No straight pipe requirements upstream or downstream for installation in tight places.
- Real-time flow display based on pulses per gallon.
- Photo diode option for high frequency output, even at low flows. Powered by the controller or by a sensor decoder.
- Provides +/- 2% accuracy across a wide range of flows.
- Also used with NLC-100S, NLC-100D and NLC-3D systems.

NLC-100S HYBRID

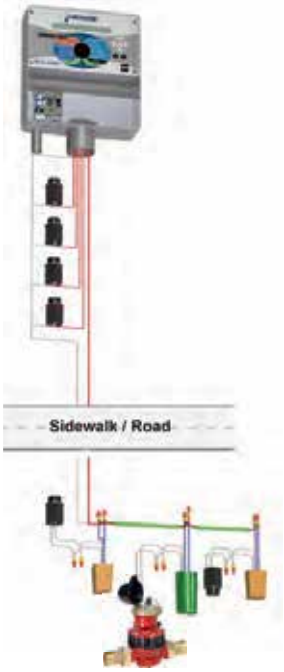
NLC-100S HYBRID CONTROLLER CONFIGURATIONS

The following illustrations show NLC-100S Hybrid controller configurations with the addition of a Master Valve and Flow Sensor, valves, and simple 2-Wire conversion.

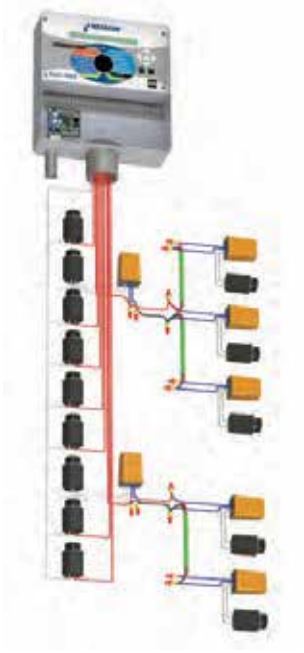
Simple conversion to a 2-Wire system



Adding 2-Wire, master valve and flow sensor using existing conventional wires



Conventional outputs with addition of valves by converting to a 2-Wire system



2-WIRE DISTANCES

SIMULTANEOUS OPERATIONS	TW18/ 2AWG	TW16/ 2AWG	TW14/ 2AWG
1 VALVE	3,000	6,000	8,000
2 VALVES OR 1 VALVE + MASTER VALVE	2,300	4,600	6,000
3 VALVES OR 2 VALVES + MASTER VALVE	1,500	3,000	4,000

DIMENSIONS & WEIGHT

LENGTH	12"
DEPTH	6"
HEIGHT	12"
WEIGHT (LBS.)	15

ORDERING MATRIX

OPTIONS

NLCSH - **STATION COUNT** - **CABINET/PEDESTAL** - **COMMUNICATION** - **HYBRID OPTION** - **OUTPUT**

CONVENTIONAL HYBRID PANEL

STATION COUNT *
012 = 12 Stations
018 = 18 Stations
025 = 25 Stations
037 = 37 Stations
050 = 50 Stations
075 = 75 Stations
100 = 100 Stations

* Order appropriate Cabinet size (C12 or C20) for Station Count

CABINET/PEDESTAL
C12 = 12" x 12" x 6" Cabinet (Up to 25 stations)
C20 = 12" x 20" x 6" Cabinet (Over 25 stations)
PE1 = 2 Piece Top Entry SS Lite Pedestal (1-100 stations)
PE3 = 1 Piece Top Entry SS HD Pedestal (1-100 stations)
NON = No Cabinet or Pedestal

COMMUNICATION
W = Cellular
L = LAN
N = None

HYBRID OPTIONS
06 = Up to 6 Valves, MV, Flow Sensor
24 = Up to 24 Valves, MV, Flow Sensor

OUTPUT TERMINAL
Y = Heavy Duty Output Lightning Strip
N = No Output

ORDERING EXAMPLE:

NLCSH-012-C12-W-06-N = Model Number **NLCSH012-C12W06N**
Netafim Landscape Controller NLC-100S, Conventional with Hybrid Technology, 12 Stations, 12" x 12" x 6" Cabinet, Cellular, 6 Stations, No Output Terminal

NETAFIM LANDSCAPE CONTROLLER

2-Wire Interface Adapts to
Any Conventional Controller
Enabling System Expansion

NLC-3D HYBRID

APPLICATIONS

- Commercial, residential, HOA and sports field applications with a conventional control system
- Retrofit applications requiring a flow sensor and/or master valve
- Applications that require the rezoning or expansion of existing systems

SPECIFICATIONS

- Stations (valves): 6 or 24
  48 maximum with additional parallel 3D
- Electrical input: 24VAC sourced from current controller
- Each 3D interface includes (1) master valve and (1) flow sensor input
- Up to 3 stations simultaneously
- 2-Wire distances up to 8,000'
- Status LEDs

FEATURES & BENEFITS

CONVERT TO A 2-WIRE DECODER SYSTEM

Combine a 2-Wire decoder with existing conventional wiring output, directly from the controller, for true hybrid applications.

ADD MULTIPLE VALVES

From any existing valve location, add multiple valves without having to install wires back to the controller.

TRUE 2-WIRE DECODER CONTROL

Take full advantage of increased wire distances, smaller wire sizes and added flexibility with this two wire interface.

ADD A MASTER VALVE OR FLOW SENSOR

Allows the addition of a master valve and a flow sensor without having to install wires back to the controller. Combination flow and master valve decoder available.

QUALIFIES FOR USE ON **LEED PROJECTS**

NETAFIM LANDSCAPE CONTROLLER INSTALLATION VIDEOS AVAILABLE AT
WWW.YOUTUBE.COM/NETAFIMUSA

HYDROMETER FLOW SENSOR

The perfect solution for retrofitting - contains both a master valve and flow sensor in one sturdy package.

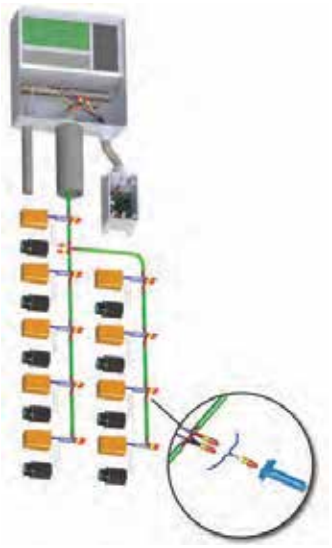
- No straight pipe requirements upstream or downstream for installation in tight places.
- Real-time flow display based on pulses per gallon.
- Photo diode option for high frequency output, even at low flows. Powered by the controller or a 3D decoder.
- Provides +/- 2% accuracy across a wide range of flows.
- Can also be used with NLC-100S, NLC-100S Hybrid and NLC-100D systems.

NLC-3D HYBRID

NLC-3D HYBRID INTERFACE CONFIGURATIONS

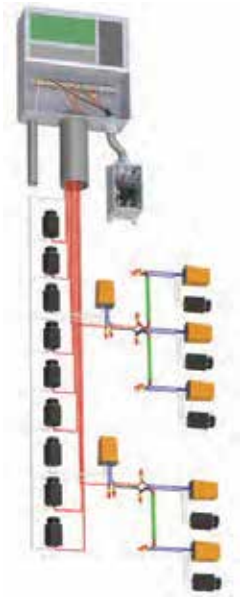
The following illustrations show a NLC-3D Hybrid interface with a conventional controller.

Simple conversion to a 2-Wire system



Adding 2-Wire, master valve and flow sensor using existing conventional wires

Conventional outputs with addition of valves by converting to a 2-Wire system



2-WIRE DISTANCES

SIMULTANEOUS OPERATIONS	TW18/ 2AWG	TW16/ 2AWG	TW14/ 2AWG
1 VALVE	3,000	6,000	8,000
2 VALVES OR 1 VALVE + MASTER VALVE	2,300	4,600	6,000
3 VALVES OR 2 VALVES + MASTER VALVE	1,500	3,000	4,000

CONFIGURATIONS

NLC3D24	Supports up to 24 decoders plus (1) master valve and (1) flow sensor for 2-Wire decoder applications
NLC3D6	Supports up to 6 decoders plus (1) master valve and (1) flow sensor for retrofit or repair applications

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
NLC3D6	3D with 2-Wire Output for up to 6 Valves, Flow Sensor, Master Valve, NEMA 4X Enclosure, Flex Conduit Connection for Hybrid Function
NLC3D24	3D with 2-Wire Output for up to 24 Valves, Flow Sensor, Master Valve, NEMA 4X Enclosure, Flex Conduit Connection for Hybrid function
NLC3DDLPCB	Add-on PCB with Dynamic Load Feature for Smart Controllers with Advanced Valve Diagnostics by Hydropoint, ET Water and Eagle Series by Rainmaster
NLC3D6PCB	NLC3D6 with PCB board pre-installed
NLC3D24PCB	NLC3D24 with PCB board pre-installed
NLC3DLD050	Orange Single Valve Line Decoder for use with Hybrid SH Controller, NLC3D6 and NLC3D24 (Sold in Box of 10 ea.)
NLC3DLD050-1	Orange Single Valve Line Decoder for use with Hybrid SH Controller, NLC3D6 and NLC3D24 (Sold in Qty of 1 ea.)
NLCLSP100	Line Surge Protection - Yellow
NLC3DSD100M	Green Flow Sensor Decoder for NLC-3D with use of Photo Diode Meters
NLC3DSD100	Green Flow Sensor Decoder for NLC-3D with use of Reed Switch Meters
NLC3D-FMVM	Flow / Master Valve Decoder with 5VDC for NLC-3D with use of Photo Diode or Reed Switch Hydrometer

DECODERS

SINGLE LINE DECODER FOR NLC-100D, NLC-100S HYBRID, NLC3D6 AND NLC3D24

Used to energize a single valve in the field. It's easily programmed by the user with a specific station ID, then it's connected anywhere along the 2-wire path. Activating that specific station turns on the valve.

The decoder can energize almost any 24VAC solenoid and can be programmed with different IDs when desired.

Tucor wire, designed to ensure a secure, water-tight electrical pathway, is the preferred method of connecting the field decoder to the controller.

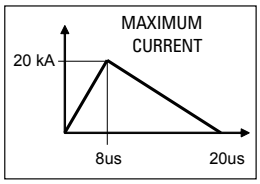
DIMENSIONS: 1.5" x 1.4" x 2.3"
LEAD LENGTH: 11"
MODEL NUMBERS: NLCDECODER (Blue: NLC-100D)
NLC3DLD050 (Orange: NLC-100S Hybrid, NLC3D6 and NLC3D24)

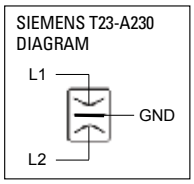
SURGE PROTECTOR

The NLCSP100 provides protection along the 2-wire path from electrical surges due to lightning or other static charges. High voltage spikes traveling down the 2-wire path are effectively shunted to the ground through the NLCSP100 minimizing the risk to decoders and other devices. As an integral part of your 2-wire system, you'll get added peace of mind during bad weather.

NORMAL SPARK OVER: 230V
MAX. SPARK OVER: 450V
COLOR: Yellow
MODEL NUMBER: NLCSP100

An NLCSP100 must be installed and grounded every 500' and at the end of a wire run. Resistance of the ground wires must be 50Ω or less.





SENSOR DECODER FOR NLC3D6, NLC3D24 AND NLC-100S HYBRID

Fully programmable decoders that provide an interface between the NLC-3D and field sensors. This means that any type of sensor, such as flow, temperature or moisture, can be added to a new or existing system.

The sensor decoder is installed on the same 2-wire path as the line decoder so the sensor can be a considerable distance from the controller.

Two models of flow sensor decoders based on the type of pulsed output register on the flow meter.

OPERATION
When used with an appropriate flow meter, output is registered and recorded as flow rates. Various controller responses may be defined based on sensor input. The controller polls the sensors for data either once or twice per minute, depending on the number of sensors installed.

INSTALLATION
The sensor is wired directly to the 2-wire path. Inputs are color-coded for proper polarization. Sensor calibration is defined by the controller's PC software and is then transferred to the controller via the RS232 connection. Includes built-in surge protection, Model NLCSP100.

ELECTRICAL INPUT: 4-20mA or pulses per time interfaces
Sensor resolution is 200 steps
Accuracy better than 1% of max. value
Factory programmed ID
COLOR: Green
MODEL NUMBERS: NLC3DSD100 - use with reed switch
NLC3DSD100M - use with Photo Diode
NLC3D-FMVM - flow and master valve Combo Decoder. For use with NLC-3D and Hydrometer.

SOIL MOISTURE MONITORING

Soil moisture monitoring uses sensors and probes embedded in the soil root zone. Netafim Landscape Controllers are able to continuously monitor the soil for the proper amount of moisture, specific to the location and plant's needs. Installed along with any of our ET devices, the Cycle Management Software will ensure the soil both starts and remains at the proper moisture content, even as the ET feedback adjusts the irrigation around that optimal level.

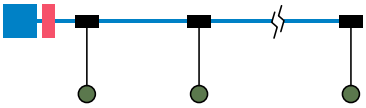
Soil moisture monitoring ensures that the Netafim Landscape Controller will economically deliver just the water the plant needs to stay healthy and green.

NLCSMS100 SOIL MOISTURE SENSOR

The NLCSMS100 is a single sensor design, buried within the root zone. It will continuously monitor the moisture content and provide feedback to the controller. Compensation factors are included for a range of soil types.

CABLE LENGTH:	13' Extendable to 2,000'
OPERATING TEMPERATURE:	23º F - 122º F
DIMENSIONS:	7" x 0.6" x 2.75"
MODEL NUMBERS:	NLCSMS100 (Single Sensor)
	NLCSMI232 (Soil Moisture Interface)

SMS-100 SENSOR



SPECIFICATIONS

- Each sensor can be assigned to interrupt one or more programs.
- Up to 150 sensors can be monitored.
- One NLCSMI232 Interface Board is required for each controller.
- Up to 10 sensors may be connected to the controller.
- Soil Moisture Sensors require a separate wire path independent of the two-wire path.
- All sensors must be connected to a single extension cable. The maximum distance from the controller is 2,000'. The maximum distance of the sensor from the extension cable is 13'.
- The extension cable must be approved Tucor Cable.
- A RealNet communication subscription is required to enable data monitoring. All other features may be programmed at the controller.

SYMBOL	NAME
	Netafim Landscape Controller
	Soil Moisture Sensor or probe with 13' Cable
	Waterproof Connection
	TW-18/4MS Extension Cable
	NLCSMI232 Interface

NLCSMP-12-A SOIL MOISTURE PROBE

The NLCSMP-12-A incorporates multiple sensors within one housing for a range of measurements in a depth of soil.

LENGTH:	12"
CABLE LENGTH:	13'
SENSORS:	6
SENSOR SPACING:	2"
MODEL NUMBER:	NLCSMP-12-A

SMP-12-A PROBE

WIRELESS WEATHER STATION

The NLCET300W is an affordable wireless weather station that allows the Netafim Landscape Controllers (NLC-100S, NLC-100S Hybrid and NLC-100D) to use local ET data. This ET information is used to provide precise watering of the soil, based on the specific environmental factors. The controller can be programmed with a range of parameters, using the ET data to its maximum effectiveness, using neither too much nor too little water in the irrigation programs. Since the weather station monitors local weather conditions, you're assured that the information closely reflects what's happening near the controller, not many miles away.

The weather station communicates to the controller wirelessly, up to 1,000' line-of-sight, and is powered by solar cells. Controller connection to the weather station is through a wireless receiver, which sends wired ET and rain pulses to the controller. The weather station can share its data with other Netafim Landscape Controllers either over the internet* or by using a separate wireless receiver at each controller. Merely adding a tipping rain bucket to each controller ensures accurate weather data that is specific to each controller.

SPECIFICATIONS

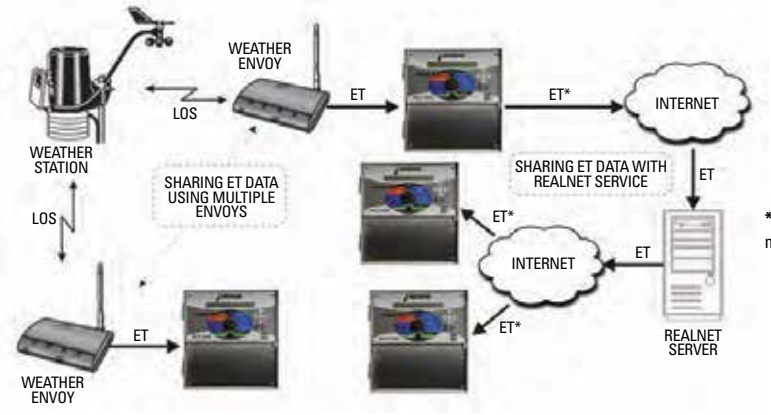
TRANSMISSION FREQUENCY:	902-928 MHz FHSS
TEMPERATURE RANGE:	-40º F to 150º F
LICENSE:	No license required less than 8mW
PRIMARY POWER:	Solar power
BACKUP POWER:	CR-123A 3-volt lithium battery (8 months without sunlight, greater than 2 years depending on solar charging)
WIRELESS RECEIVER:	Powered by a 120VAC-5 VDC, 200 ma transformer. Wiring to controller supplied by user, 4-cond. 26AWG Comm.link up to 1,000' LOS, 200'-400' through walls.
SOFTWARE:	Includes WeatherLink Windows Software

MODEL NUMBERS:

NLCET 300W	(Weather Station without Enclosure)
NLCET300WX	(Weather Station with Enclosure)
NLCETWLR	(Wireless Receiver)
NLCETWLRIP	(Wireless Receiver, Internet Link)
NLCETWLRX	(Wireless Receiver with Enclosure)
NLCETWLRXIP	(Wireless Receiver, Internet Link with Enclosure)

PARAMETERS MEASURED

WIND - speed and direction
RAINFALL - total accumulated and rate
TEMPERATURE - indoor and outdoor
HUMIDITY - indoor and outdoor
SOLAR RADIATION
BAROMETRIC PRESSURE



* For redirection from one weather station to multiple controllers requires a RealNet subscription.

2-WIRE CABLE BY TUCOR

Tucor control cable is a tough, reliable wire designed to operate valve decoders and sensor decoders. It consists of tin-coated bar copper conductors insulated with PVDC and high-density polyethylene, direct burial jacket. Operating two valves simultaneously, the cable can extend to 10,200 feet on 16 gauge and 16,300 on 14 gauge. *Additional gauges are available by special order.

In most applications, 16 gauge is the wire of choice since it is easier and more durable than 14 gauge. Wires are color-coded red and black for troubleshooting ease. Jackets are available in multiple colors for easy wire identification and tracing.

SPECIFICATIONS

INSULATION:	Polyvinylchloride
JACKET:	Polyethylene
WIRE:	Copper, Tin Coated
SIZES:	12 to 18 AWG
COLORS*:	Red, Green, Yellow, Orange, Purple, Blue
SPOOL LENGTH*:	500', 1,000', 2,500'

*Certain wire colors and spool sizes are special order.

WORKING RANGE

The length of the cable required for reliable operation of the valves is dependent on the size of the wires and the number of valves that need to be operated simultaneously. If the line is supplied with power from one end only (not looped), the ranges can be read off the table below. The table is based on standard valves (24VAC, 2 W, 28 Ω) using default Netafim switch code settings. Looping the wire greatly extends the range.

Utilizing a different valve power, changing the specified wiring type, length, valve distribution or connectors may result in less capability of active stations.

NUMBER OF SIMULTANEOUS PROGRAMS	VALVES EVENLY DISTRIBUTED ALONG 2-WIRE (FT.)		
	AWG 18	AWG 16	AWG 14
1	7,000	11,000	17,800
2	6,400	10,200	16,300
3	5,500	8,800	14,100
4	4,900	7,800	12,500
5	4,400	7,000	11,200
6	4,000	6,300	10,100
7	3,600	5,800	9,200
8	3,300	5,300	8,500
9	3,100	4,900	7,800
10	2,800	4,600	7,300
10 + 1 MANUAL	2,700	4,300	6,800
10 + 2 MANUAL	2,500	4,000	6,400

Wire run lengths in this chart are specific to the NLC-100D Decoder System.

TIPPING RAIN BUCKET

The tipping rain bucket is used along with the ET data from a remote weather station to generate accurate local rain data. While the weather station's ET data may be used by controllers which are some distance away from each other, the rain data may vary considerably over the area. The tipping rain bucket ensures the rain pulses being sent to the controller will reflect actual rainfall amounts around the controller's location.

There are two models available:

MODEL NUMBER:	**NLCTRB100**
RESOLUTION:	0.01" rain per tip
SENSOR:	Magnetic reed switch
OUTPUT:	Contact closure
CABLE TYPE:	4 Cond., 26 AWG
CABLE LENGTH:	40' included
MAX. CABLE LENGTH:	900'
DIMENSIONS:	8.75" D x 9.5" H
WEIGHT:	2.3 LBS.

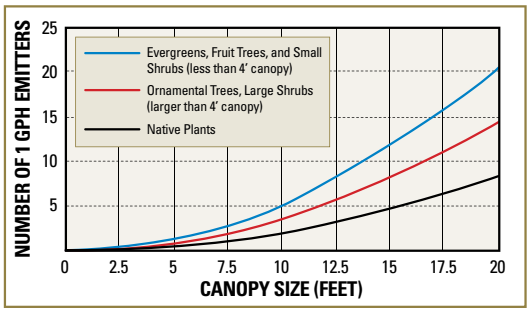
MODEL NUMBER:	**NLCTRB200**
RESOLUTION:	0.04" rain per tip
SENSOR:	Magnetic reed switch
OUTPUT:	Contact closure
CABLE TYPE:	2 Cond., 22 AWG
CABLE LENGTH:	30' included
MAX. CABLE LENGTH:	60'
DIMENSIONS:	4" L x 2" W x 4"H
WEIGHT:	.4 LBS.

POINT SOURCE DESIGN

IRRIGATING TREES, SHRUBS AND NATIVE PLANTS

For trees, shrubs and native plants with wide and/or random spacing requirements, point source drip irrigation is the perfect alternative. In landscape areas that are sparsely planted, irrigating within the plant's canopy conserves water and inhibits weed growth in the areas with no plants. Depending on the plant's canopy size and soil type, the number of point source emitters can be easily determined.

SIMPLIFIED DRIP DESIGN GRAPH



APPROXIMATE WETTED DIAMETER and WETTED AREA PER EMITTER (PER SOIL TYPE)

EMITTER FLOW RATE	WETTED DIAMETER PER EMITTER (FT.)			WETTED AREA PER EMITTER (SQ. FT.)		
	CLAY SOIL	LOAM SOIL	SANDY SOIL	CLAY SOIL	LOAM SOIL	SANDY SOIL
0.5 GPH	5 - 7	3 - 5	2 - 3	20 - 38	7 - 20	3 - 7
1.0 GPH	7 - 8	5 - 6	3 - 3.5	38 - 50	20 - 28	7 - 10
2.0 GPH	8 - 9	6 - 7	3.5 - 4	50 - 64	28 - 38	10 - 13

Emitter flow rates have an impact on the soil's ability to absorb water. The lighter the shaded box indicates the more desirable flow rate given the soil selection.

$$\text{Number of Emitters per Plant} = \frac{\text{Plant Canopy (square feet)} \times 0.75}{\text{Wetted Area per Emitter (square feet)}}$$

For example:

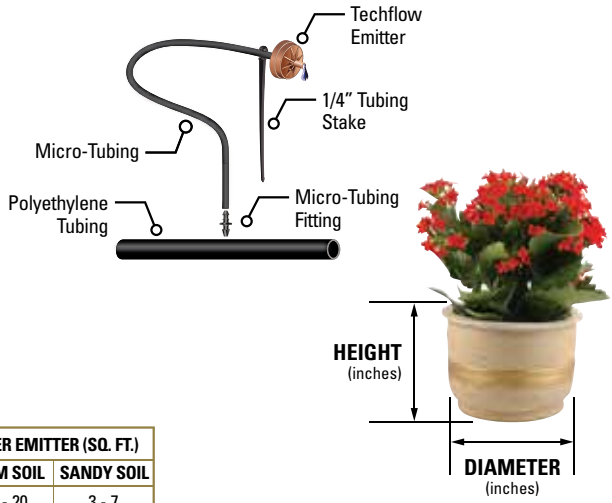
- Tree with 16' canopy in a loam soil.
- Plant root zone = $(16')^2$ x 0.7854 = 256 x 0.7854 = 201 square feet.
- Number of 1.0 GPH emitters required = 201 x .75/24 = 150.8/24 = 6.28 = 6 - 1.0 GPH emitters.

IRRIGATION DURATION

CLIMATE	RUN TIME (HOURS)
VERY COOL	1.3
COOL	2.6
MODERATE	3.5
HOT	4.2
HIGH DESERT	5.1
LOW DESERT	5.9

IRRIGATING CONTAINERS

The correct watering of containers can be difficult when using a hose, sprinklers or sprays. Either not enough or too much water is applied; or the frequency of watering is inefficient to promote a healthy environment for the plant to thrive. By using a point source drip irrigation system, the emitter can easily be installed in each container and operated for the correct time and frequency to insure the correct amount of water is applied for healthy plant growth.



$$\text{Container Size (gallons)} = \frac{\text{Surface Area} = \text{Diameter (m.)} \times .7854 \quad \text{Surface Area (sq. in.)} \times \text{Height (inches)}}{231}$$

CONTAINER IRRIGATION (FREQUENCY)

CLIMATE	SANDY SOIL	LOAM SOIL	CLAY SOIL	POTTING SOIL
VERY COOL	2 DAYS	3 DAYS	8 DAYS	2 DAYS
COOL	1 ½ DAYS	2 DAYS	6 DAYS	DAILY
MODERATE	1 ½ DAYS	2 DAYS	6 DAYS	DAILY
HOT	DAILY	2 DAYS	5 DAYS	DAILY
HIGH DESERT	DAILY	1 ½ DAYS	4 DAYS	DAILY
LOW DESERT	DAILY	DAILY	3 DAYS	DAILY

CONTAINER IRRIGATION (EMITTER FLOW RATE and RUN TIME)

CONTAINER SIZE (GALLONS)	EMITTER FLOW (GPH)	SANDY SOIL (IN MIN.)	LOAM SOIL (IN MIN.)	CLAY SOIL (IN MIN.)	POTTING SOIL (IN MIN.)
1	0.5	3	5	11	2
2	0.5	6	10	20	4
5	1.0	9	15	30	6
15	1.0	25	40	90	18
25	1.0	40	75	150	35

POINT SOURCE EMITTERS

COMPARISON

POINT SOURCE EMITTERS COMPARISON CHART

	SELF-PIERCING EMITTERS			TECHFLOW EMITTERS			BD and WP EMITTERS		
	See Page 71			See Page 72			See Page 73		
Emitter Flow Rate (GPH)	0.5	1.0	2.0	0.5	1.0	2.0	0.5	1.0	2.0
									
APPLICATION	For Quick and Easy Installations Requiring No Tools			For Systems with a Wide Range of Pressure Variation			For Low Pressure or Gravity Fed Systems		
TOOL REQUIRED FOR INSTALLATION	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PRESSURE COMPENSATION RANGE	10.15 to 58 psi	10.15 to 58 psi	10.15 to 58 psi	14.5 to 58 psi	14.5 to 58 psi	14.5 to 58 psi	No	No	No
MAXIMUM PRESSURE	58 psi	58 psi	58 psi	58 psi	58 psi	58 psi	29 psi	29 psi	29 psi
INTERNAL CHECK VALVE	1.74 psi, holds up to 3.9' of water			2.2 psi, holds up to 5' of water			No	No	No
ANTI-SIPHON	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
SELF-CLEANING	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
BAG QUANTITY: 25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
100	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A
250	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1,000	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A

With Check Valve

SELF-PIERCING EMITTERS

APPLICATIONS

- For use with blank polyethylene tubing, Techline® HCVXR, CV, DL and RW
- Install on-surface or subsurface
- Wide-spaced plantings
- Tree planting
- Hanging baskets
- Flower boxes
- Planters or pots

SPECIFICATIONS

- Flow rates: 0.5, 1.0 and 2.0 GPH
- Pressure compensation range: 10.15 to 58 psi
- Maximum pressure: 58 psi
- Uses 0.160" x 0.220" micro-tubing (Model EDTUBE - in black or white)
- Barb size: Inlet 0.160" - 0.170"
  Outlet 0.160"
- Recommended minimum filtration: 120 mesh

FEATURES & BENEFITS

SELF-PIERCING BARB

Easy to install, no tools required. Optional insertion tool available.

1.74 psi INTERNAL CHECK VALVE

Helps prevent low emitter drainage holding back up to a 3.9' column of water. Can be used with Techline HCVXR and CV Dripline.

ANTI-SIPHON OPERATION

Prevents contaminants from being drawn into the emitter.

PRESSURE COMPENSATING

Delivers the same flow from 10.15 to 58 psi.

SELF-CLEANING ACTION

Exclusive TurboNet® flow path design regulates flow and provides continuous self-cleaning action during operation.

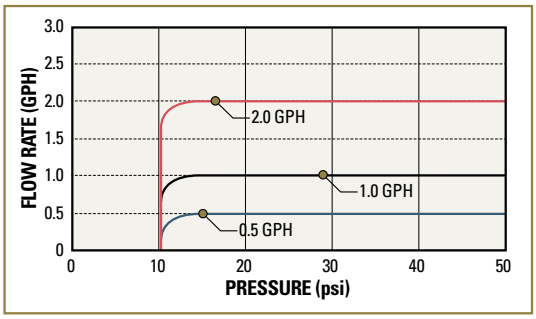
BLUE EMITTER
0.5 GPH

BLACK EMITTER
1.0 GPH

RED EMITTER
2.0 GPH

INSERTION TOOL
Model SPDT

FLOW RATE VS. PRESSURE



ORDERING INFORMATION

FLOW RATE	COLOR	BAG QUANTITY	MODEL NUMBER
0.5 GPH	BLUE	25	SPCV05-25
		100	SPCV05-100
		250	SPCV05-250
		1,000	SPCV05-1000
1.0 GPH	BLACK	25	SPCV10-25
		100	SPCV10-100
		250	SPCV10-250
		1,000	SPCV10-1000
2.0 GPH	RED	25	SPCV20-25
		100	SPCV20-100
		250	SPCV20-250
		1,000	SPCV20-1000

TECHFLOW EMITTERS

Pressure Compensating Emitters

APPLICATIONS

- For use with systems with a wide range of pressure variations (14.5 to 58 psi)
- Install on-surface or subsurface
- Wide range of plant spacings
- Hanging baskets, flower baskets, pots, interiorscapes

SPECIFICATIONS

- Flow rates: 0.5, 1.0 and 2.0 GPH
- Pressure compensation range: 14.5 to 58 psi
- Maximum pressure: 58 psi
- Uses 0.160" x 0.220" micro-tubing (Model EDTUBE - in black or white)
- Barb size: Inlet 0.160" - 0.170"
  Outlet 0.160"
- Recommended minimum filtration: 120 mesh

FEATURES & BENEFITS

UNIQUE EMITTER DESIGN

Regulates flow and provides continuous self-cleaning action during operation.

2.2 psi INTERNAL CHECK VALVE

Helps prevent low emitter drainage by holding back up to a 5' column of water.

ANTI-SIPHON OPERATION

Prevents contaminates from being drawn into emitter.

COLOR-CODED EMITTER

Denotes flow rate.

CAN BE USED WITH TECHLINE® HCVXR AND CV DRIPLINE

Without causing dripline drainage.

RED WPC EMITTER
0.5 GPH

BLACK WPC EMITTER
1.0 GPH

GREEN WPC EMITTER
2.0 GPH

WPC SHOWN WITH BUG CAP

BUG CAP

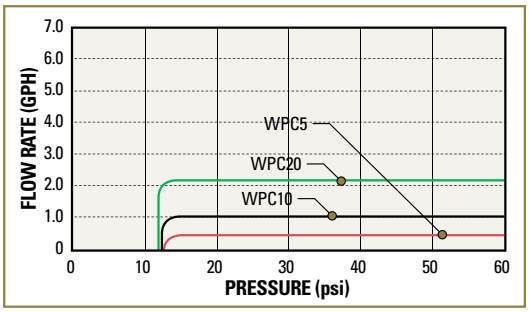
BARBED ADAPTER
ADAPTS TO ¼" BARB

WPC SHOWN WITH BARBED ADAPTER

ORDERING INFORMATION

FLOW RATE	COLOR	BAG QUANTITY	MODEL NUMBER
BARB INLET X NIPPLE OUTLET			
0.5 GPH	RED	25	WPC5
		250	WPC5-250
1.0 GPH	BLACK	25	WPC10
		250	WPC10-250
2.0 GPH	GREEN	25	WPC20
		250	WPC20-250
BUG CAP			
-	-	25	WPBC
BARBED ADAPTER			
-	-	25	11WPCON47-B

FLOW RATE VS. PRESSURE



Non-Pressure Compensating Emitters

BD and WP EMITTERS

APPLICATIONS

- Use in piping networks with limited pressure variation
- Planters and pots
- Wide-spaced plantings

SPECIFICATIONS

- Flow rates: 0.5, 1.0 and 2.0 GPH
- BD and WP models use 0.160" x 0.220" micro-tubing (Model EDTUBE)
- Barb size: Inlet 0.160" - 0.170"
  Outlet 0.160"
- Maximum pressure: 29 psi
- Recommended minimum filtration: 120 mesh

FEATURES & BENEFITS

WIDE TURBULENT FLOW PASSAGE

Resists clogging and works well in low pressure applications.

BARB INLET

For easier installations.

COLOR-CODED EMITTER

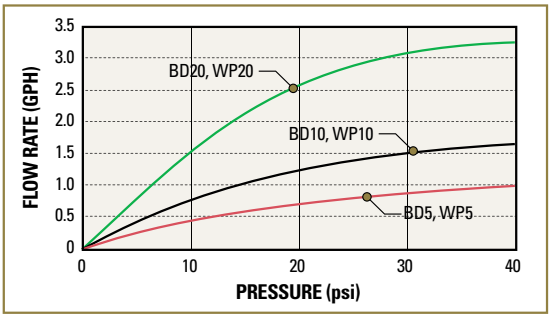
Denotes flow rate.

RED BD EMITTER
0.5 GPH

BLACK BD EMITTER
1.0 GPH

GREEN BD EMITTER
2.0 GPH

FLOW RATE VS. PRESSURE



RED WP EMITTER
0.5 GPH

BLACK WP EMITTER
1.0 GPH

GREEN WP EMITTER
2.0 GPH

BD EMITTERS ORDERING INFORMATION

FLOW RATE	COLOR	BAG QUANTITY	MODEL NUMBER
0.5 GPH	RED	25	BD5
		250	BD5-250
1.0 GPH	BLACK	25	BD10
		250	BD10-250
2.0 GPH	GREEN	25	BD20
		250	BD20-250

WP EMITTERS ORDERING INFORMATION

FLOW RATE	COLOR	BAG QUANTITY	MODEL NUMBER
0.5 GPH	RED	25	WP5
		250	WP5-250
1.0 GPH	BLACK	25	WP10
		250	WP10-250
2.0 GPH	GREEN	25	WP20
		250	WP20-250

POLYETHYLENE TUBING

APPLICATIONS

- For use with point source drip emitters, micro-spray or micro-sprinklers for irrigating ground cover, trees and shrub beds
- Provides flexible and durable header or transition to dripline
- For on-surface or subsurface installations
- Positions on-line emission devices in hard to reach places

FEATURES & BENEFITS

SPEEDS INSTALLATION OF DRIP IRRIGATION SYSTEM

Allows for fast connections and easy layouts.

UV RESISTANT

Withstands heat, direct sun and harsh environments.

MANUFACTURED UNDER STRINGENT QUALITY CONTROLS

Assures highest quality as every coil undergoes a battery of tests and over 30 quality checks.

MADE WITH THE FINEST LOW DENSITY POLYETHYLENE RESIN AVAILABLE

Available in black or white.

BLACK POLYETHYLENE
1,000' COIL

WHITE POLYETHYLENE
1,000' COIL

POLYETHYLENE TUBING
MADE WITH POST CONSUMER RECYCLED MATERIAL

ORDERING INFORMATION

DESCRIPTION	PRESSURE RATING (psi)	COIL LENGTH	MODEL NUMBER
BLACK POLYETHYLENE TUBING			
16MM O.D. (0.520" X 0.620", 0.050" WALL)	70	250'	PE052062-25
		500'	PE052062-05
		1,000'	PE052062-10
½" (0.620" X 0.710", 0.045" WALL)	52	500'	PE062071-05
		1,000'	PE062071-10
½" (0.600" X 0.700", 0.050" WALL)	61	250'	PE060070-25
		500'	PE060070-05
		1,000'	PE060070-10
¾" (0.820" X 0.940", 0.060" WALL)	54	500'	PE082094-05
		1,000'	PE082094-10
1" (1.060" X 1.200", 0.070" WALL)	49	500'	PE106120-05
WHITE POLYETHYLENE TUBING			
16MM O.D. (0.520" X 0.620", 0.050" WALL)	70	500'	PE052062-05W
		1,000'	PE052062-10W
½" (0.600" X 0.700", 0.050" WALL)	61	500'	PE060070-05W
		1,000'	PE060070-10W
¾" (0.820" X 0.940", 0.060" WALL)	54	500'	PE082094-05W
1" (1.060" X 1.200", 0.070" WALL)	49	500'	PE106120-05W

Available in White and Black Polyethylene

MICRO-TUBING

APPLICATIONS

- For extending the drip emitter outlet/discharge close to a tree or shrub
- For use with point source drip emitters on trees, shrub beds, potted plants and hanging baskets

SPECIFICATIONS

- ¼" (4/6mm) EDTUBE Black: 0.160" ID, 0.220" OD, 0.030" wall 100' or 1,000' lengths
- ¼" (4/7mm) EDTUBE White: 0.156" ID, 0.264" OD, 0.054" wall 100' or 1,000' lengths

FEATURES & BENEFITS

UV AND ACID RESISTANT POLYETHYLENE RESIN MATERIALS

Withstands hot and cold weather better than vinyl. Provides excellent hold characteristics on point source drip emitter barbed outlets and fittings in any kind of weather.

MANUFACTURED UNDER STRINGENT QUALITY CONTROLS

Assures highest quality product as every coil undergoes a battery of tests and over 30 quality checks.

WIDE COMPATIBILITY

Compatible with all brands and models of point source emitters that accept ¼" (0.160" ID) micro-tubing.

WHITE PE TUBING IS REFLECTIVE AND OPAQUE

Prevents algae growth. Produces cooler water temperatures - enhancing plant growth.

WHITE TUBING
1,000' COIL

BLACK TUBING
1,000' COIL

FRICTION LOSS PER 100 FEET

NOMINAL SIZE		¼" EDTUBE BLACK		¼" EDTUBE WHITE	
FLOW RATE		0.160" I.D 0.220" O.D. 0.030" WALL		0.156" I.D 0.264" O.D. 0.054" WALL	
GPM	GPH	VELOCITY FPS	LOSS psi	VELOCITY FPS	LOSS psi
0.01	0.50	0.13	0.08	0.14	0.09
0.02	1.00	0.27	0.27	0.28	0.31
0.03	2.00	0.53	0.92	0.56	1.04
0.05	3.00	0.80	1.87	0.84	2.11
0.07	4.00	1.06	3.09	1.12	3.49
0.08	5.00	1.33	4.57	1.40	5.16
0.10	6.00	1.60	6.29	1.68	7.10
0.12	7.00	1.86	8.24	1.96	9.29
0.13	8.00	2.13	10.40	2.24	11.74
0.15	9.00	2.39	12.79	2.52	14.43
0.17	10.00	2.66	15.38	2.80	17.35
0.20	12.00	3.19	21.15	3.36	23.87
0.23	14.00	3.72	27.70	3.92	31.26
0.27	16.00	4.26	35.00	4.48	39.49
0.30	18.00	4.79	43.01	5.04	48.53
0.33	20.00	5.32	51.72	5.60	58.36

ORDERING INFORMATION

COIL LENGTH	MODEL NUMBER
BLACK - 0.160" x 0.220"	
100'	EDTUBE-01
1,000'	EDTUBE-10
WHITE - 0.156" x 0.264"	
100'	EDTUBE-01W
1,000'	EDTUBE-10W

MICRO-TUBE FITTINGS

APPLICATIONS

- Fits all models of 1/4" tubing with inside diameter of 0.160" or 0.156"

FEATURES & BENEFITS

BARBED FITTINGS

For secure fit and easy installation without clamps, glue or tools.

UV-RESISTANT

Withstands heat, direct sunlight and harsh chemicals.

WIDE COMPATIBILITY

Compatible with all brands and models of ¼" micro-tubing.

FITTINGS

1/4" BARB TEE (0.160")
Model EDTUBETEE

1/4" MICRO-VALVE (0.160")
Model EDTUBEMVLV-B

1/4" BARB ADAPTER/COUPLER (0.160")
Model EDTUBEBA

1/4" TUBING STAKE
Model EDTUBESTK

1/4" / 3/8" GOOF PLUG (0.160" / 0.230")
Model GOOFPLUG

1/4" BARBED 8-WAY x 1/2" MPT ADAPTER
(0.160") for EDTUBE
Model EDTUBE8XMT

INSTALLATION TOOLS

STEEL PUNCH FOR 0.160" MICRO FITTINGS
Model MTUBESPUN

PLASTIC HANDLE PUNCH FOR 0.160" MICRO FITTINGS
Model MTUBEPPUN

INSERTION TOOL FOR SELF-PIERCING EMITTERS
Model SPDT

DRIPLINE CALCULATIONS

FORMULA 1.1

Estimated Total Length of Dripline =

$$\frac{\text{Irrigated Area} \times 12}{\text{Minimum Recommended Lateral Spacing (inches)}}$$

In Which:

Estimated Total Length of Dripline = Total Footage of Dripline in a Zone

Irrigated Area = Total Area in Square Feet

Minimum Recommended Lateral (Row) Spacing = The minimum row spacing from the General Guidelines Chart in inches

FORMULA 1.2

Application Rate =

$$\frac{231.1 \times \text{Emitter Flow Rate (GPH)}}{\text{Dripline Row Spacing (inches)} \times \text{Emitter Spacing (inches)}}$$

In Which:

Application Rate is = Inches per Hour of Water Being Applied

Emitter Flow Rate = Gallons per Hour Flow of One Emitter

Emitter Spacing = Spacing in Inches of Emitters Inside Tubing

Dripline Row Spacing = Inches Between Techline Laterals (rows)

Note: *0.4, 0.6, and 0.9 GPH are nominal flow rates. Actual flow rates of 0.42, 0.61, and 0.92 GPH should be used in the calculations.*

FORMULA 1.3

Number of Emitters in a Zone =

$$\frac{\text{Total Dripline} \times 12}{\text{Emitter Spacing (inches)}}$$

Number of Emitters = Number of Emitters

Total Dripline = Length of All Dripline in a Zone in Feet

Emitter Spacing = Spacing in Inches of Emitters Inside Tubing

FORMULA 1.4

Flow Per Zone =

$$\frac{\text{Number of Emitters} \times \text{Emitter Flow Rate (GPH)}}{60}$$

In Which:

Flow Per Zone = Total Gallons per Minute

Number of Emitters = Number of Emitters

Emitter Flow Rate = Gallons per Hour of One Emitter

FORMULA 1.5

Estimated Total Zone Flow =

$$\left(\frac{\text{Irrigated Area} \times 144}{\text{Emitter Spacing (inches)} \times \text{Dripline Row Spacing (inches)}} \right) \times \text{Emitter Flow Rate (GPH)} \div 60$$

In Which:

Estimated Total Zone Flow = Gallons per Minute in Zone

Irrigated Area = Total Area in Square Feet

Emitter Spacing = Spacing in Inches of Emitters Inside Tubing

Dripline Row Spacing = Inches Between Techline Laterals (rows)

Emitter Flow Rate = Gallons per Hour of One Emitter

FORMULA 1.6

Estimated Run Time =

$$\frac{\text{Daily Et (inches)}}{\text{Application Rate (inches per hour)}} \times 60 \text{ (minutes)}$$

In Which:

Estimated Run Time = Estimated Number of minutes of run time for a particular zone (based upon input data)

Et = Evapotranspiration; The amount of water released from soil by evaporation and transpiration from plants.

Daily Et = Monthly Et divided by the number of days in the associated month.

Application Rate = Inches per hour of water being applied. This can be calculated by using Formula 1.2, or by referencing the Application Rate Charts on pages 78-79.

60 minutes = Conversion factor from hours to minutes (60 minutes in one hour).

Note: *Evapotranspiration rates for your geographic location can be found by searching the internet for local weather stations, from weather data services, from on-site weather collection devices, or from Historical Et data. If you are not irrigating daily, the Daily Et should be multiplied by the number of days since your prior irrigation cycle in order to replace the total Et since your previous irrigation cycle. If the Estimated Run Time is long enough to create water run-off, the total run time should be broken into multiple irrigation cycles. Cycle run time should not generate water run-off.*

APPLICATION RATES

TECHLINE® CV, DL, RW, RWP AND EZ DRIPLINES

APPLICATION RATES 0.26 GPH EMITTER

FLOW RATE (GPH)	EMITTER SPACING (IN.)	LATERAL SPACING (IN.)	APPLICATION RATE (IN./HR.)	TIME TO APPLY 1/4" (MIN.)
0.26	12	12	0.42	36
0.26	12	14	0.36	42
0.26	12	16	0.31	48
0.26	12	18	0.28	54
0.26	12	20	0.25	60
0.26	12	22	0.23	66
0.26	12	24	0.21	72
0.26	18	12	0.28	54
0.26	18	14	0.24	63
0.26	18	16	0.21	72
0.26	18	18	0.19	81
0.26	18	20	0.17	90
0.26	18	22	0.15	99
0.26	18	24	0.14	108

APPLICATION RATES 0.4 GPH EMITTER

FLOW RATE (GPH)	EMITTER SPACING (IN.)	LATERAL SPACING (IN.)	APPLICATION RATE (IN./HR.)	TIME TO APPLY 1/4" (MIN.)
0.4	12	12	0.64	23
0.4	12	14	0.55	27
0.4	12	16	0.48	31
0.4	12	18	0.43	35
0.4	12	20	0.39	39
0.4	12	22	0.35	43
0.4	12	24	0.32	47
0.4	18	12	0.43	35
0.4	18	14	0.37	41
0.4	18	16	0.32	47
0.4	18	18	0.29	53
0.4	18	20	0.26	58
0.4	18	22	0.23	64
0.4	18	24	0.21	70

APPLICATION RATES 0.6 GPH EMITTER

FLOW RATE (GPH)	EMITTER SPACING (IN.)	LATERAL SPACING (IN.)	APPLICATION RATE (IN./HR.)	TIME TO APPLY 1/4" (MIN.)
0.6	12	12	0.96	16
0.6	12	14	0.83	18
0.6	12	16	0.72	21
0.6	12	18	0.64	23
0.6	12	20	0.58	26
0.6	12	22	0.53	29
0.6	12	24	0.48	31
0.6	18	12	0.64	23
0.6	18	14	0.55	27
0.6	18	16	0.48	31
0.6	18	18	0.43	35
0.6	18	20	0.39	39
0.6	18	22	0.35	43
0.6	18	24	0.32	47
0.6	24	12	0.48	31
0.6	24	14	0.41	36
0.6	24	16	0.36	42
0.6	24	18	0.32	47
0.6	24	20	0.29	52
0.6	24	22	0.26	57
0.6	24	24	0.24	62

APPLICATION RATES 0.9 GPH EMITTER

FLOW RATE (GPH)	EMITTER SPACING (IN.)	LATERAL SPACING (IN.)	APPLICATION RATE (IN./HR.)	TIME TO APPLY 1/4" (MIN.)
0.9	12	12	1.44	10
0.9	12	14	1.24	12
0.9	12	16	1.08	14
0.9	12	18	0.96	16
0.9	12	20	0.87	17
0.9	12	22	0.79	19
0.9	12	24	0.72	21
0.9	18	12	0.96	16
0.9	18	14	0.83	18
0.9	18	16	0.72	21
0.9	18	18	0.64	23
0.9	18	20	0.58	26
0.9	18	22	0.53	29
0.9	18	24	0.48	31
0.9	24	12	0.72	21
0.9	24	14	0.62	24
0.9	24	16	0.54	28
0.9	24	18	0.48	31
0.9	24	20	0.43	35
0.9	24	22	0.39	38
0.9	24	24	0.36	42

Application Rate = (231.1 x GPH) / (Emitter Spacing x Lateral Spacing)

APPLICATION RATES

TECHLINE® HCVXR DRIPLINE

APPLICATION RATES 0.33 GPH EMITTER

FLOW RATE (GPH)	EMITTER SPACING (IN.)	LATERAL SPACING (IN.)	APPLICATION RATE (IN./HR.)	TIME TO APPLY 1/4" (MIN.)
0.33	12	12	0.53	28
0.33	12	14	0.45	33
0.33	12	16	0.40	38
0.33	12	18	0.35	42
0.33	12	20	0.32	47
0.33	12	22	0.29	52
0.33	12	24	0.26	57
0.33	18	12	0.35	42
0.33	18	14	0.30	50
0.33	18	16	0.26	57
0.33	18	18	0.24	64
0.33	18	20	0.21	71
0.33	18	22	0.19	78
0.33	18	24	0.18	85
0.33	24	12	0.26	57
0.33	24	14	0.23	66
0.33	24	16	0.20	76
0.33	24	18	0.18	85
0.33	24	20	0.16	94
0.33	24	22	0.14	104
0.33	24	24	0.13	113

APPLICATION RATES 0.53 GPH EMITTER

FLOW RATE (GPH)	EMITTER SPACING (IN.)	LATERAL SPACING (IN.)	APPLICATION RATE (IN./HR.)	TIME TO APPLY 1/4" (MIN.)
0.53	12	12	0.85	18
0.53	12	14	0.73	21
0.53	12	16	0.64	24
0.53	12	18	0.56	27
0.53	12	20	0.51	30
0.53	12	22	0.46	32
0.53	12	24	0.42	35
0.53	18	12	0.56	27
0.53	18	14	0.48	31
0.53	18	16	0.42	35
0.53	18	18	0.38	40
0.53	18	20	0.34	44
0.53	18	22	0.31	49
0.53	18	24	0.28	53
0.53	24	12	0.42	35
0.53	24	14	0.36	41
0.53	24	16	0.32	47
0.53	24	18	0.28	53
0.53	24	20	0.25	59
0.53	24	22	0.24	65
0.53	24	24	0.21	71

APPLICATION RATES 0.77 GPH EMITTER

FLOW RATE (GPH)	EMITTER SPACING (IN.)	LATERAL SPACING (IN.)	APPLICATION RATE (IN./HR.)	TIME TO APPLY 1/4" (MIN.)
0.77	12	12	1.23	12
0.77	12	14	1.05	14
0.77	12	16	0.92	16
0.77	12	18	0.82	18
0.77	12	20	0.74	20
0.77	12	22	0.67	22
0.77	12	24	0.61	24
0.77	18	12	0.82	18
0.77	18	14	0.70	21
0.77	18	16	0.61	24
0.77	18	18	0.55	27
0.77	18	20	0.49	31
0.77	18	22	0.45	34
0.77	18	24	0.41	37
0.77	24	12	0.61	24
0.77	24	14	0.53	28
0.77	24	16	0.46	33
0.77	24	18	0.41	37
0.77	24	20	0.37	41
0.77	24	22	0.34	45
0.77	24	24	0.31	49

Application Rate = (231.1 x GPH) / (Emitter Spacing x Lateral Spacing)

APPLICATION RATES 1.16 GPH EMITTER

FLOW RATE (GPH)	EMITTER SPACING (IN.)	LATERAL SPACING (IN.)	APPLICATION RATE (IN./HR.)	TIME TO APPLY 1/4" (MIN.)
1.16	12	12	1.86	8
1.16	12	14	1.60	9
1.16	12	16	1.40	11
1.16	12	18	1.24	12
1.16	12	20	1.12	13
1.16	12	22	1.02	15
1.16	12	24	0.93	16
1.16	18	12	1.24	12
1.16	18	14	1.07	14
1.16	18	16	0.93	16
1.16	18	18	0.83	18
1.16	18	20	0.75	20
1.16	18	22	0.68	22
1.16	18	24	0.62	24
1.16	24	12	0.93	16
1.16	24	14	0.80	19
1.16	24	16	0.70	21
1.16	24	18	0.62	24
1.16	24	20	0.56	27
1.16	24	22	0.51	30
1.16	24	24	0.47	32

FRICTION LOSS Polyethylene Tubing

FRICTION LOSS CHARACTERISTICS POLYETHYLENE (PE) SDR PRESSURE RATED PIPE

(2306, 3206, 3306) SDR 7, 9, 11.5, 15, C=150, Sizes ½" to 6", Flows 1 to 900 GPM

PSI LOSS OF 100 FEET OF PIPE (PSI PER 100 FEET)

SIZE I.D.		½" 0.622''		¾" 0.824''		1" 1.049''		1 ¼" 1.380''		1 ½" 1.610''		2" 2.067''		2 ½" 2.469''		3" 3.068''		4" 4.026''		6" 6.065''	
Flow GPM	Flow GPH	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
1	60	1.06	0.49	0.60	0.12	0.37	0.04	0.21	0.01	0.16	0.00	0.10	0.00	0.07	0.00	0.04	0.00	0.03	0.00	0.01	0.00
2	120	2.11	1.76	1.20	0.45	0.74	0.14	0.43	0.04	0.32	0.02	0.19	0.01	0.13	0.00	0.09	0.00	0.05	0.00	0.02	0.00
3	180	3.17	3.73	1.80	0.95	1.11	0.29	0.64	0.08	0.47	0.04	0.29	0.01	0.20	0.00	0.13	0.00	0.08	0.00	0.03	0.00
4	240	4.22	6.35	2.41	1.62	1.48	0.50	0.86	0.13	0.63	0.06	0.38	0.02	0.27	0.01	0.17	0.00	0.10	0.00	0.04	0.00
5	300	5.28	9.60	3.01	2.44	1.86	0.76	1.07	0.20	0.79	0.09	0.48	0.03	0.34	0.01	0.22	0.00	0.13	0.00	0.06	0.00
6	360	6.34	13.46	3.61	3.43	2.23	1.06	1.29	0.28	0.95	0.13	0.57	0.04	0.40	0.02	0.26	0.01	0.15	0.00	0.07	0.00
7	420	7.39	17.91	4.21	4.56	2.60	1.41	1.50	0.37	1.10	0.18	0.67	0.05	0.47	0.02	0.30	0.01	0.18	0.00	0.08	0.00
8	480	8.45	22.93	4.81	5.84	2.97	1.80	1.72	0.47	1.26	0.22	0.76	0.07	0.54	0.03	0.35	0.01	0.20	0.00	0.09	0.00
9	540	9.50	28.52	5.41	7.26	3.34	2.24	1.93	0.59	1.42	0.28	0.86	0.08	0.60	0.03	0.39	0.01	0.23	0.00	0.10	0.00
10	600	10.56	34.67	6.02	8.82	3.71	2.73	2.15	0.72	1.58	0.34	0.96	0.10	0.67	0.04	0.43	0.01	0.25	0.00	0.11	0.00
11	660	11.61	41.36	6.62	10.53	4.08	3.25	2.36	0.86	1.73	0.40	1.05	0.12	0.74	0.05	0.48	0.02	0.28	0.00	0.12	0.00
12	720	12.67	48.60	7.22	12.37	4.45	3.82	2.57	1.01	1.89	0.48	1.15	0.14	0.80	0.06	0.52	0.02	0.30	0.01	0.13	0.00
14	840			8.42	16.45	5.20	5.08	3.00	1.34	2.21	0.63	1.34	0.19	0.94	0.08	0.61	0.03	0.35	0.01	0.16	0.00
16	960			9.63	21.07	5.94	6.51	3.43	1.71	2.52	0.81	1.53	0.24	1.07	0.10	0.69	0.04	0.40	0.01	0.18	0.00
18	1,080			10.83	26.21	6.68	8.10	3.86	2.13	2.84	1.01	1.72	0.30	1.21	0.13	0.78	0.04	0.45	0.01	0.20	0.00
20	1,200			12.03	31.85	7.42	9.84	4.29	2.59	3.15	1.22	1.91	0.36	1.34	0.15	0.87	0.05	0.50	0.01	0.22	0.00
22	1,320			13.24	38.00	8.17	11.74	4.72	3.09	3.47	1.46	2.10	0.43	1.47	0.18	0.95	0.06	0.55	0.02	0.24	0.00
24	1,440					8.91	13.79	5.15	3.63	3.78	1.72	2.29	0.51	1.61	0.21	1.04	0.07	0.60	0.02	0.27	0.00
26	1,560					9.65	16.00	5.58	4.21	4.10	1.99	2.49	0.59	1.74	0.25	1.13	0.09	0.66	0.02	0.29	0.00
28	1,680					10.39	18.35	6.01	4.83	4.41	2.28	2.68	0.68	1.88	0.28	1.22	0.10	0.71	0.03	0.31	0.00
30	1,800					11.14	20.85	6.44	5.49	4.73	2.59	2.87	0.77	2.01	0.32	1.30	0.11	0.76	0.03	0.33	0.00
35	2,100					12.99	27.74	7.51	7.30	5.52	3.45	3.35	1.02	2.35	0.43	1.52	0.15	0.88	0.04	0.39	0.01
40	2,400							8.58	9.35	6.30	4.42	3.82	1.31	2.68	0.55	1.74	0.19	1.01	0.05	0.44	0.01
45	2,700							9.65	11.63	7.09	5.49	4.30	1.63	3.02	0.69	1.95	0.24	1.13	0.06	0.50	0.01
50	3,000							10.73	14.14	7.88	6.68	4.78	1.98	3.35	0.83	2.17	0.29	1.26	0.08	0.56	0.01
55	3,300							11.80	16.87	8.67	7.97	5.26	2.36	3.69	0.99	2.39	0.35	1.39	0.09	0.61	0.01
60	3,600							12.87	19.82	9.46	9.36	5.74	2.77	4.02	1.17	2.60	0.41	1.51	0.11	0.67	0.01
65	3,900							13.94	22.98	10.24	10.86	6.21	3.22	4.36	1.36	2.82	0.47	1.64	0.13	0.72	0.02
70	4,200									11.03	12.45	6.69	3.69	4.69	1.55	3.04	0.54	1.76	0.14	0.78	0.02
75	4,500									11.82	14.15	7.17	4.19	5.03	1.77	3.25	0.61	1.89	0.16	0.83	0.02
80	4,800									12.61	15.95	7.65	4.73	5.36	1.99	3.47	0.69	2.02	0.18	0.89	0.03
85	5,100									13.40	17.84	8.13	5.29	5.70	2.23	3.69	0.77	2.14	0.21	0.94	0.03
90	5,400											8.61	5.88	6.03	2.48	3.91	0.86	2.27	0.23	1.00	0.03
95	5,700											9.08	6.50	6.37	2.74	4.12	0.95	2.39	0.25	1.06	0.03
100	6,000											9.56	7.15	6.70	3.01	4.34	1.05	2.52	0.28	1.11	0.04
110	6,600											10.52	8.53	7.37	3.59	4.77	1.25	2.77	0.33	1.22	0.05
120	7,200											11.47	10.02	8.04	4.22	5.21	1.47	3.02	0.39	1.33	0.05
130	7,800											12.43	11.62	8.71	4.89	5.64	1.70	3.28	0.45	1.44	0.06
140	8,400											13.39	13.33	9.38	5.61	6.08	1.95	3.53	0.52	1.55	0.07
150	9,000													10.05	6.38	6.51	2.22	3.78	0.59	1.67	0.08
160	9,600													10.72	7.19	6.94	2.50	4.03	0.67	1.78	0.09
170	10,200													11.39	8.04	7.38	2.79	4.28	0.74	1.89	0.10
180	10,800													12.06	8.94	7.81	3.11	4.54	0.83	2.00	0.11
190	11,400													12.73	9.88	8.25	3.43	4.79	0.92	2.11	0.12
200	12,000													13.40	10.87	8.68	3.78	5.04	1.01	2.22	0.14
225	13,500															9.76	4.70	5.67	1.25	2.50	0.17
250	15,000															10.85	5.71	6.30	1.52	2.78	0.21
275	16,500															11.93	6.81	6.93	1.81	3.05	0.25
300	18,000															13.02	8.00	7.56	2.13	3.33	0.29
325	19,500																	8.19	2.47	3.61	0.34
350	21,000																	8.82	2.84	3.89	0.39
375	22,500																	9.45	3.22	4.16	0.44
400	24,000																	10.08	3.63	4.44	0.49
425	25,500																	10.71	4.06	4.72	0.55
450	27,000																	11.34	4.52	5.00	0.62
475	28,500																	11.97	4.99	5.28	0.68
500	30,000																	12.60	5.49	5.55	0.75
550	33,000																	13.86	6.55	6.11	0.89
600	36,000																			6.66	1.05
650	39,000																			7.22	1.22
700	42,000																			7.77	1.39
750	45,000																			8.33	1.58
800	48,000																			8.88	1.79
850	51,000																			9.44	2.00
900	54,000																			9.99	2.22

Note: Shaded areas of the chart indicate velocities over 5 Ft/Sec. Use with Caution.

Velocities are calculated using the general equation:
V = (0.4085 * (Q / d^2)

Friction Losses are calculated using the Hazen-Williams Equation: Hf = 0.2083 * (100 / C)^1.852 * (Q^1.852 / d^4.866)

V = FPS (feet per second)

Hf = PSI/100 Ft. (pounds per square inch per 100 feet)

C = 150

Q = GPM (gallons per minute)

d = ID (inside diameter)

Schumacher IRRIGATION

Your Irrigation Superstore
Email: irrigate@schumacherirrigation.com
www.schumacherirrigation.com

Toll Free: 800-246-3685
Phone: 402-246-3685
Fax: 402-246-2072

Schedule 40 Pipe

FRICTION LOSS

FRICTION LOSS CHARACTERISTICS PVC SCHEDULE 40 IPS PLASTIC PIPE

(1120, 1220), C=150, Sizes ½" to 6", Flows 1 to 900 GPM

PSI LOSS OF 100 FEET OF PIPE (PSI PER 100 FEET)

SIZE	½"		¾"		1"		1 ¼"		1 ½"		2"		2 ½"		3"		4"		6"	
I.D.	0.622''		0.824''		1.049''		1.380''		1.610''		2.067''		2.469''		3.068''		4.026''		6.065''	
O.D.	0.840''		1.050''		1.315''		1.660''		1.900''		2.375''		2.875''		3.500''		4.500''		6.625''	
WALL	0.109''		0.113''		0.133''		0.140''		0.145''		0.154''		0.203''		0.216''		0.237''		0.280''	
Flow GPM	Flow GPH	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
1	60	1.06	0.43	0.60	0.11	0.37	0.03	0.21	0.01	0.16	0.00	0.10	0.00	0.07	0.00	0.04	0.00	0.03	0.00	0.01	0.00
2	120	2.11	1.55	1.20	0.39	0.74	0.12	0.43	0.03	0.32	0.02	0.19	0.00	0.13	0.00	0.09	0.00	0.05	0.00	0.02	0.00
3	180	3.17	3.28	1.80	0.84	1.11	0.26	0.64	0.07	0.47	0.03	0.29	0.01	0.20	0.00	0.13	0.00	0.08	0.00	0.03	0.00
4	240	4.22	5.59	2.41	1.42	1.48	0.44	0.86	0.12	0.63	0.05	0.38	0.02	0.27	0.01	0.17	0.00	0.10	0.00	0.04	0.00
5	300	5.28	8.45	3.01	2.15	1.86	0.66	1.07	0.17	0.79	0.08	0.48	0.02	0.34	0.01	0.22	0.00	0.13	0.00	0.06	0.00
6	360	6.34	11.85	3.61	3.02	2.23	0.93	1.29	0.25	0.95	0.12	0.57	0.03	0.40	0.01	0.26	0.01	0.15	0.00	0.07	0.00
7	420	7.39	15.76	4.21	4.01	2.60	1.24	1.50	0.33	1.10	0.15	0.67	0.05	0.47	0.02	0.30	0.01	0.18	0.00	0.08	0.00
8	480	8.45	20.18	4.81	5.14	2.97	1.59	1.72	0.42	1.26	0.20	0.76	0.06	0.54	0.02	0.35	0.01	0.20	0.00	0.09	0.00
9	540	9.50	25.10	5.41	6.39	3.34	1.97	1.93	0.52	1.42	0.25	0.86	0.07	0.60	0.03	0.39	0.01	0.23	0.00	0.10	0.00
10	600	10.56	30.51	6.02	7.77	3.71	2.40	2.15	0.63	1.58	0.30	0.96	0.09	0.67	0.04	0.43	0.01	0.25	0.00	0.11	0.00
11	660	11.61	36.40	6.62	9.26	4.08	2.86	2.36	0.75	1.73	0.36	1.05	0.11	0.74	0.04	0.48	0.02	0.28	0.00	0.12	0.00
12	720	12.67	42.77	7.22	10.88	4.45	3.36	2.57	0.89	1.89	0.42	1.15	0.12	0.80	0.05	0.52	0.02	0.30	0.00	0.13	0.00
14	840			8.42	14.48	5.20	4.47	3.00	1.18	2.21	0.56	1.34	0.16	0.94	0.07	0.61	0.02	0.35	0.01	0.16	0.00
16	960			9.63	18.54	5.94	5.73	3.43	1.51	2.52	0.71	1.53	0.21	1.07	0.09	0.69	0.03	0.40	0.01	0.18	0.00
18	1,080			10.83	23.06	6.68	7.12	3.86	1.88	2.84	0.89	1.72	0.26	1.21	0.11	0.78	0.04	0.45	0.01	0.20	0.00
20	1,200			12.03	28.03	7.42	8.66	4.29	2.28	3.15	1.08	1.91	0.32	1.34	0.13	0.87	0.05	0.50	0.01	0.22	0.00
22	1,320			13.24	33.44	8.17	10.33	4.72	2.72	3.47	1.28	2.10	0.38	1.47	0.16	0.95	0.06	0.55	0.01	0.24	0.00
24	1,440					8.91	12.14	5.15	3.20	3.78	1.51	2.29	0.45	1.61	0.19	1.04	0.07	0.60	0.02	0.27	0.00
26	1,560					9.65	14.08	5.58	3.71	4.10	1.75	2.49	0.52	1.74	0.22	1.13	0.08	0.66	0.02	0.29	0.00
28	1,680					10.39	16.15	6.01	4.25	4.41	2.01	2.68	0.60	1.88	0.25	1.22	0.09	0.71	0.02	0.31	0.00
30	1,800					11.14	18.35	6.44	4.83	4.73	2.28	2.87	0.68	2.01	0.28	1.30	0.10	0.76	0.03	0.33	0.00
35	2,100					12.99	24.41	7.51	6.43	5.52	3.04	3.35	0.90	2.35	0.38	1.52	0.13	0.88	0.04	0.39	0.00
40	2,400							8.58	8.23	6.30	3.89	3.82	1.15	2.68	0.49	1.74	0.17	1.01	0.04	0.44	0.01
45	2,700							9.65	10.24	7.09	4.83	4.30	1.43	3.02	0.60	1.95	0.21	1.13	0.06	0.50	0.01
50	3,000							10.73	12.44	7.88	5.88	4.78	1.74	3.35	0.73	2.17	0.25	1.26	0.07	0.56	0.01
55	3,300							11.80	14.84	8.67	7.01	5.26	2.08	3.69	0.88	2.39	0.30	1.39	0.08	0.61	0.01
60	3,600							12.87	17.44	9.46	8.24	5.74	2.44	4.02	1.03	2.60	0.36	1.51	0.10	0.67	0.01
65	3,900							13.94	20.23	10.24	9.55	6.21	2.83	4.36	1.19	2.82	0.41	1.64	0.11	0.72	0.02
70	4,200									11.03	10.96	6.69	3.25	4.69	1.37	3.04	0.48	1.76	0.13	0.78	0.02
75	4,500									11.82	12.45	7.17	3.69	5.03	1.55	3.25	0.54	1.89	0.14	0.83	0.02
80	4,800									12.61	14.03	7.65	4.16	5.36	1.75	3.47	0.61	2.02	0.16	0.89	0.02
85	5,100									13.40	15.70	8.13	4.65	5.70	1.96	3.69	0.68	2.14	0.18	0.94	0.02
90	5,400											8.61	5.17	6.03	2.18	3.91	0.76	2.27	0.20	1.00	0.03
95	5,700											9.08	5.72	6.37	2.41	4.12	0.84	2.39	0.22	1.06	0.03
100	6,000											9.56	6.29	6.70	2.65	4.34	0.92	2.52	0.25	1.11	0.03
110	6,600											10.52	7.50	7.37	3.16	4.77	1.10	2.77	0.29	1.22	0.04
120	7,200											11.47	8.82	8.04	3.71	5.21	1.29	3.02	0.34	1.33	0.05
130	7,800											12.43	10.22	8.71	4.31	5.64	1.50	3.28	0.40	1.44	0.05
140	8,400											13.39	11.73	9.38	4.94	6.08	1.72	3.53	0.46	1.55	0.06
150	9,000													10.05	5.61	6.51	1.95	3.78	0.52	1.67	0.07
160	9,600													10.72	6.33	6.94	2.20	4.03	0.59	1.78	0.08
170	10,200													11.39	7.08	7.38	2.46	4.28	0.66	1.89	0.09
180	10,800													12.06	7.87	7.81	2.73	4.54	0.73	2.00	0.10
190	11,400													12.73	8.70	8.25	3.02	4.79	0.81	2.11	0.11
200	12,000													13.40	9.56	8.68	3.32	5.04	0.89	2.22	0.12
225	13,500															9.76	4.13	5.67	1.10	2.50	0.15
250	15,000															10.85	5.02	6.30	1.34	2.78	0.18
275	16,500															11.93	5.99	6.93	1.60	3.05	0.22
300	18,000															13.02	7.04	7.56	1.88	3.33	0.26
325	19,500																	8.19	2.18	3.61	0.30
350	21,000																	8.82	2.50	3.89	0.34
375	22,500																	9.45	2.84	4.16	0.39
400	24,000																	10.08	3.20	4.44	0.44
425	25,500																	10.71	3.58	4.72	0.49
450	27,000																	11.34	3.98	5.00	0.54
475	28,500																	11.97	4.40	5.28	0.60
500	30,000																	12.60	4.83	5.55	0.66
550	33,000																	13.86	5.77	6.11	0.79
600	36,000																			6.66	0.92
650	39,000																			7.22	1.07
700	42,000																			7.77	1.23
750	45,000																			8.33	1.39
800	48,000																			8.88	1.57
850	51,000																			9.44	1.76
900	54,000																			9.99	1.95

Note: Shaded areas of the chart indicate velocities over 5 Ft/Sec. Use with Caution.

Velocities are calculated using the general equation:
V = (0.4085 * (Q / d^2)

Friction Losses are calculated using the Hazen-Williams Equation: Hf = 0.2083 * (100 / C)^1.852 * (Q^1.852 / d^4.866)

V = FPS (feet per second)

Hf = PSI/100 Ft. (pounds per square inch per 100 feet)

C = 150

Q = GPM (gallons per minute)

d = ID (inside diameter)

Schumacher IRRIGATION

Your Irrigation Superstore
Email: irrigate@schumacherirrigation.com
www.schumacherirrigation.com

Toll Free: 800-246-3685
Phone: 402-246-3685
Fax: 402-246-2072

FRICTION LOSS PVC Class 40

FRICTION LOSS CHARACTERISTICS PVC CLASS 200 IPS PLASTIC PIPE

(1120, 1220) SDR 21, C=150, Sizes ½" to 6", Flows 1 to 900 GPM

PSI LOSS OF 100 FEET OF PIPE (PSI PER 100 FEET)

SIZE		½" (Class 315)		¾"		1"		1 ¼"		1 ½"		2"		2 ½"		3"		4"		6"	
I.D.		0.716''		0.930''		1.189''		1.502''		1.720''		2.149''		2.601''		3.166''		4.072''		5.993''	
O.D.		0.840''		1.050''		1.315''		1.660''		1.900''		2.375''		2.875''		3.500''		4.500''		6.625''	
WALL		0.062''		0.060''		0.063''		0.079''		0.090''		0.113''		0.137''		0.167''		0.214''		0.316''	
Flow GPM	Flow GPH	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
1	60	0.80	0.22	0.47	0.06	0.29	0.02	0.18	0.01	0.14	0.00	0.09	0.00	0.06	0.00	0.04	0.00	0.02	0.00	0.01	0.00
2	120	1.59	0.78	0.94	0.22	0.58	0.07	0.36	0.02	0.28	0.01	0.18	0.00	0.12	0.00	0.08	0.00	0.05	0.00	0.02	0.00
3	180	2.39	1.65	1.42	0.46	0.87	0.14	0.54	0.04	0.41	0.02	0.27	0.01	0.18	0.00	0.12	0.00	0.07	0.00	0.03	0.00
4	240	3.19	2.82	1.89	0.79	1.16	0.24	0.72	0.08	0.55	0.04	0.35	0.01	0.24	0.01	0.16	0.00	0.10	0.00	0.05	0.00
5	300	3.98	4.26	2.36	1.19	1.44	0.36	0.91	0.12	0.69	0.06	0.44	0.02	0.30	0.01	0.20	0.00	0.12	0.00	0.06	0.00
6	360	4.78	5.97	2.83	1.67	1.73	0.51	1.09	0.16	0.83	0.08	0.53	0.03	0.36	0.01	0.24	0.00	0.15	0.00	0.07	0.00
7	420	5.58	7.95	3.31	2.23	2.02	0.67	1.27	0.22	0.97	0.11	0.62	0.04	0.42	0.01	0.29	0.01	0.17	0.00	0.08	0.00
8	480	6.37	10.18	3.78	2.85	2.31	0.86	1.45	0.28	1.10	0.14	0.71	0.05	0.48	0.02	0.33	0.01	0.20	0.00	0.09	0.00
9	540	7.17	12.66	4.25	3.55	2.60	1.07	1.63	0.34	1.24	0.18	0.80	0.06	0.54	0.02	0.37	0.01	0.22	0.00	0.10	0.00
10	600	7.97	15.38	4.72	4.31	2.89	1.30	1.81	0.42	1.38	0.22	0.88	0.07	0.60	0.03	0.41	0.01	0.25	0.00	0.11	0.00
11	660	8.77	18.35	5.20	5.14	3.18	1.56	1.99	0.50	1.52	0.26	0.97	0.09	0.66	0.03	0.45	0.01	0.27	0.00	0.13	0.00
12	720	9.56	21.56	5.67	6.04	3.47	1.83	2.17	0.59	1.66	0.30	1.06	0.10	0.72	0.04	0.49	0.02	0.30	0.00	0.14	0.00
14	840	11.16	28.69	6.61	8.04	4.05	2.43	2.54	0.78	1.93	0.40	1.24	0.14	0.85	0.05	0.57	0.02	0.34	0.01	0.16	0.00
16	960	12.75	36.73	7.56	10.29	4.62	3.11	2.90	1.00	2.21	0.52	1.42	0.17	0.97	0.07	0.65	0.03	0.39	0.01	0.18	0.00
18	1,080			8.50	12.80	5.20	3.87	3.26	1.24	2.49	0.64	1.59	0.22	1.09	0.09	0.73	0.03	0.44	0.01	0.20	0.00
20	1,200			9.45	15.56	5.78	4.71	3.62	1.51	2.76	0.78	1.77	0.26	1.21	0.10	0.82	0.04	0.49	0.01	0.23	0.00
22	1,320			10.39	18.56	6.36	5.62	3.98	1.80	3.04	0.93	1.95	0.32	1.33	0.12	0.90	0.05	0.54	0.01	0.25	0.00
24	1,440			11.34	21.81	6.93	6.60	4.35	2.12	3.31	1.09	2.12	0.37	1.45	0.15	0.98	0.06	0.59	0.02	0.27	0.00
26	1,560			12.28	25.29	7.51	7.65	4.71	2.45	3.59	1.27	2.30	0.43	1.57	0.17	1.06	0.07	0.64	0.02	0.30	0.00
28	1,680			13.22	29.01	8.09	8.78	5.07	2.82	3.87	1.46	2.48	0.49	1.69	0.19	1.14	0.07	0.69	0.02	0.32	0.00
30	1,800					8.67	9.97	5.43	3.20	4.14	1.65	2.65	0.56	1.81	0.22	1.22	0.08	0.74	0.02	0.34	0.00
35	2,100					10.11	13.27	6.34	4.26	4.83	2.20	3.10	0.74	2.11	0.29	1.43	0.11	0.86	0.03	0.40	0.01
40	2,400					11.56	16.99	7.24	5.45	5.52	2.82	3.54	0.95	2.42	0.38	1.63	0.14	0.99	0.04	0.45	0.01
45	2,700					13.00	21.13	8.15	6.78	6.21	3.51	3.98	1.19	2.72	0.47	1.83	0.18	1.11	0.05	0.51	0.01
50	3,000							9.05	8.24	6.90	4.26	4.42	1.44	3.02	0.57	2.04	0.22	1.23	0.06	0.57	0.01
55	3,300							9.96	9.83	7.59	5.08	4.86	1.72	3.32	0.68	2.24	0.26	1.35	0.08	0.63	0.01
60	3,600							10.86	11.55	8.28	5.97	5.31	2.02	3.62	0.80	2.45	0.31	1.48	0.09	0.68	0.01
65	3,900							11.77	13.39	8.98	6.93	5.75	2.34	3.92	0.93	2.65	0.36	1.60	0.10	0.74	0.02
70	4,200							12.68	15.36	9.67	7.95	6.19	2.69	4.23	1.06	2.85	0.41	1.72	0.12	0.80	0.02
75	4,500							13.58	17.46	10.36	9.03	6.63	3.05	4.53	1.21	3.06	0.46	1.85	0.14	0.85	0.02
80	4,800									11.05	10.17	7.08	3.44	4.83	1.36	3.26	0.52	1.97	0.15	0.91	0.02
85	5,100									11.74	11.38	7.52	3.85	5.13	1.52	3.46	0.58	2.09	0.17	0.97	0.03
90	5,400									12.43	12.65	7.96	4.28	5.43	1.69	3.67	0.65	2.22	0.19	1.02	0.03
95	5,700									13.12	13.99	8.40	4.73	5.74	1.87	3.87	0.72	2.34	0.21	1.08	0.03
100	6,000									13.81	15.38	8.85	5.20	6.04	2.06	4.08	0.79	2.46	0.23	1.14	0.04
110	6,600											9.73	6.21	6.64	2.45	4.48	0.94	2.71	0.28	1.25	0.04
120	7,200											10.61	7.30	7.25	2.88	4.89	1.11	2.96	0.33	1.36	0.05
130	7,800											11.50	8.46	7.85	3.34	5.30	1.28	3.20	0.38	1.48	0.06
140	8,400											12.38	9.71	8.45	3.83	5.71	1.47	3.45	0.43	1.59	0.07
150	9,000											13.27	11.03	9.06	4.36	6.11	1.67	3.70	0.49	1.71	0.08
160	9,600													9.66	4.91	6.52	1.89	3.94	0.55	1.82	0.08
170	10,200													10.27	5.49	6.93	2.11	4.19	0.62	1.93	0.09
180	10,800													10.87	6.11	7.34	2.35	4.43	0.69	2.05	0.11
190	11,400													11.47	6.75	7.74	2.59	4.68	0.76	2.16	0.12
200	12,000													12.08	7.42	8.15	2.85	4.93	0.84	2.27	0.13
225	13,500													13.59	9.23	9.17	3.55	5.54	1.04	2.56	0.16
250	15,000															10.19	4.31	6.16	1.27	2.84	0.19
275	16,500															11.21	5.14	6.77	1.51	3.13	0.23
300	18,000															12.23	6.04	7.39	1.78	3.41	0.27
325	19,500															13.25	7.01	8.01	2.06	3.70	0.31
350	21,000																	8.62	2.36	3.98	0.36
375	22,500																	9.24	2.68	4.27	0.41
400	24,000																	9.85	3.03	4.55	0.46
425	25,500																	10.47	3.38	4.83	0.52
450	27,000																	11.09	3.76	5.12	0.57
475	28,500																	11.70	4.16	5.40	0.63
500	30,000																	12.32	4.57	5.69	0.70
550	33,000																	13.55	5.46	6.26	0.83
600	36,000																			6.82	0.98
650	39,000																			7.39	1.13
700	42,000																			7.96	1.30
750	45,000																			8.53	1.48
800	48,000																			9.10	1.67
850	51,000																			9.67	1.86
900	54,000																			10.24	2.07

Note: Shaded areas of the chart indicate velocities over 5 Ft/Sec. Use with Caution.

Velocities are calculated using the general equation:
V = (0.4085 * (Q / d^2)

Friction Losses are calculated using the Hazen-Williams Equation: Hf = 0.2083 * (100 / C)^1.852 * (Q^1.852 / d^4.866)

V = FPS (feet per second)

Hf = PSI/100 Ft. (pounds per square inch per 100 feet)

C = 150

Q = GPM (gallons per minute)

d = ID (inside diameter)

Schumacher IRRIGATION

Your Irrigation Superstore
Email: irrigate@schumacherirrigation.com
www.schumacherirrigation.com

Toll Free: 800-246-3685
Phone: 402-246-3685
Fax: 402-246-2072

WEB RESOURCES

RESOURCES AT YOUR FINGERTIPS WWW.NETAFIMUSA.COM/LANDSCAPE

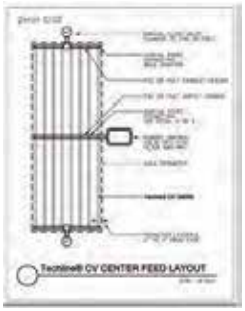
DESIGN CALCULATOR

If you know the square footage of the area you want to irrigate, whether it is a garden or turfgrass, and what type of soil, the design calculator will provide the following information:

- Estimated amount of dripline (in feet)
- The range of inches apart the rows can be
- The distance between emitters
- The total number of emitters in the zone
- The flow of the zone in GPM
- The application rate of water in inches per hour based on the row spacing chosen
- The amount of time to apply 1/4" of water based on the row spacing chosen
- Compatible with PC and Mac systems

TECHNICAL SHEETS

All the technical information you need about a Netafim product. The technical sheets and brochures give you the complete details about our products in a format that is easy to download and share.



DESIGN DETAILS

Easy to download and use, our design details show line drawings of our products and their typical layouts in multiple file formats.

SOLUTIONS BY NETAFIM

Each Solution by Netafim highlights an actual installation of Netafim Landscape and Turf products. Learn how drip irrigation helped a corporate campus reduce water consumption over 70% or how a Colorado sports complex used subsurface drip irrigation to conserve water, minimize wind water loss and irrigate even when the fields were in use.

DESIGN GUIDES

Netafim Product Design Guides walk you through the design process step by step. Includes important information about best practices and our recommendations.

LEED® CERTIFICATION

Netafim supports the strategies of LEED for acheiving a prosperous and sustainable future through cost-effective and energy-saving green buildings. Netafim products contribute to LEED credits for New Construction and Major Renovations.

WARRANTY INFORMATION

BASIC MANUFACTURER'S LIMITED WARRANTY
Products sold and/or manufactured by Netafim Irrigation, Inc. (Netafim USA) are warranted to be free from original defects in material and workmanship for a period of one (1) year from the date of delivery.

LIMITED WARRANTY FOR EMITTERS
Netafim on-line emitters are warranted to be free from original defects in materials and workmanship for a period of five (5) years from the date of shipment from Netafim.

LIMITED WARRANTY FOR DRIPLINES
Netafim warrants any polyethylene tubing and driplines (Techline® HCVXR , Techline® CV, Techline® DL, Techline® RW, Techline® RWP and Techline® EZ) sold to be free from environmental stress cracking for a period of seven (7) years from the date of original delivery.

LIMITED LIFETIME EXTENDED WARRANTY FOR TECHFILTERS®
Every Netafim Techfilter carries a 2-Year-to-Lifetime Warranty. Proper use and timely replacement of the cartridge will keep the Lifetime Extended Warranty in force.

LIMITED WARRANTY FOR FILTERS
Manual disc filters are warranted to be free from original defects in materials and workmanship for a period of one (1) year. Automatic disc filters are warranted to be free from original defects in materials and workmanship for a period of five (5) years. This warranty specifically excludes gaskets, diaphragms, seals and o-rings, which are subject to the basic one (1) year warranty.

LIMITED WARRANTY FOR VALVES, WATER METERS AND HYDROMETERS
Valve, Water Meter and Hydrometer bodies are warranted to be free from original defects in materials and workmanship for a period of five (5) years. Water Meter and Hydrometer metering components (register and metering assembly) are warranted for three (3) years. Valve and Hydrometer diaphragms are warranted for two (2) years. This warranty specifically excludes pilots, pilot accessories, relays, solenoids, solenoid component/fittings, which are subject to the basic one (1) year warranty.

Octave Water Meters are warranted to be free from original defects in materials and workmanship for a period up to five (5) years. If the meter encounters a problem, Netafim USA will choose to cover the cost of repair or replacement based on a five (5) year pro-rated schedule as follows:

Year 0 through 2: 100% Year 2 through 3: 75%
Year 3 through 4: 50% Year 4 through 5: 25%

All Octave Water Meters must be installed with a Netafim branded Combination Air/Vacuum or Continuous Acting Air Vent to qualify for the five (5) year pro-rated product warranty.

WARRANTY INFORMATION

LIMITED WARRANTY FOR ROOT INTRUSION

Netafim warrants Techline® HCVXR to be free of emitter plugging due to root intrusion for a period of fifteen (15) years from the date of original delivery.

Techline® HCVXR that has the additional protection of being part of a complete Netafim system made up of Netafim valves, filters, pressure regulators and fittings will be replaced at no cost if emitter plugging due to root intrusion occurs during the warranty period.

Year 0 through 15: 100%

Techline® HCVXR that is not part of a complete Netafim system will qualify for the special fifteen (15) year extended warranty, however the applicable buyer's remedy from date of purchase shall be limited to and pro-rated as follows:

Year 0 through 7: 100% Year 8 through 11: 50% Year 12 through 15: 25%

Warranty Conditions:

- Roots must be entering through emitter to qualify
- Roots must be reducing flow below ISO 9261 low flow target tolerances to qualify

LIMITED WARRANTY FOR NETAFIM LANDSCAPE CONTROLLERS

Netafim warrants Netafim Landscape Controllers to be free from original defects in materials and workmanship for a period of one (1) year from date of sale. Lightning/surge damage, either on the primary or line side, is not covered by this warranty.

The NLC-100S, NLC-100SH and NLC-100D Controllers will be warranted under the following schedule:

0 - 90 days from the date of shipment from Netafim USA: Controller will be replaced with a new controller at no cost to the Distributor.

91 days - 1 year from the date of shipment from Netafim USA: Controller will be exchanged for a factory-reconditioned unit.

All other Controller Components and Accessories will be replaced free of charge if found to be defective under normal use and service within the warranty period. This warranty will be extended to three (3) years total if the registration is completed and submitted and approved wire and splice kits are used.