

Reliable Solutions to Achieve Highest Quality Yield



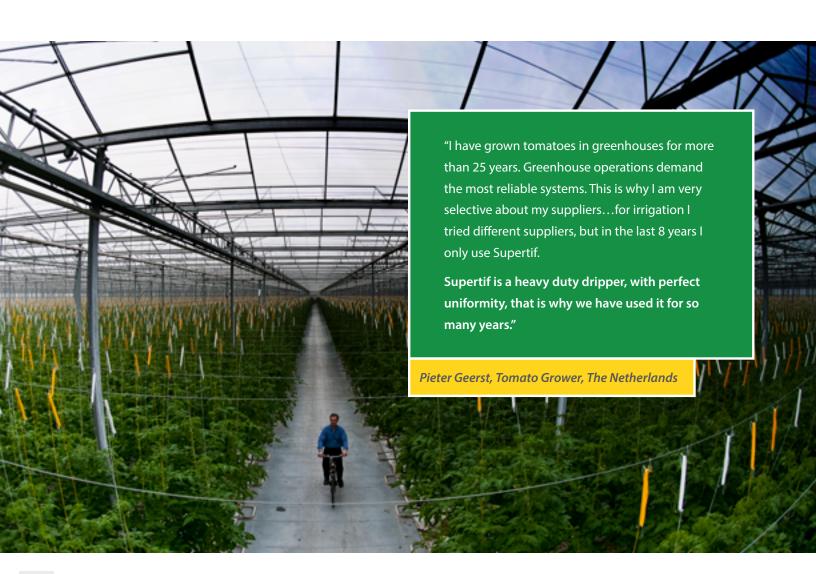
Greenhouse & Soilless Solutions

Greenhouses are becoming an increasingly more important solution in precision agriculture, specifically when dealing with varying climate zones. Greenhouses provide a safe and stable ecosystem for our food supply, allowing for increased results and high quality yields. From climate control to germination, the correct water application is critical to maximize plant productivity. We recommend working with your Rivulis representative who brings the hydraulic and agronomic expertise to develop a greenhouse solution for your unique needs.

Most greenhouse applications use drip as the primary source of irrigation. Generally integral drip lines are used in soil applications and on-line drippers are used in soilless applications. When choosing the correct dripper / drip line, there are many considerations and options available.

Rivulis offers a wide range of greenhouse irrigation solutions, including:

- On-line Drippers. From the state of the art Supertif dripper and HydroPCND drip line to the economical E1000 drippers.
- Sprinklers & Misters. Including the Rondo Micro Sprinkler, one of the most trusted sprinklers in the world and the Rivulis S5000 & S6000 Plastic Impact Sprinklers with advanced nozzles providing perfect water distribution.



Rivulis Supertif: The Most Advanced Online Dripper

If you have intensive horticulture production, you need the Rivulis Supertif range of drippers.

Trusted the world over for performance and flexibility, each dripper features a self-cleaning mechanism and precision manufacturing for maximum reliability. Additionally, Rivulis Supertif provides multiple outlet configurations, variable flow rates, no-drain options with multiple sealing and opening pressures, and a wide range of accessories.

Rivulis offers multiple Supertif Pressure Compensating (PC) Dripper outlet options for your various needs:

- Multi-function port Straight conic-barb outlet (Conic + Barb) = Multi-function port

 Use stand-alone without tube, connect direct to 3x5 tube or connect to tube using branching adaptors.
- Barbed side outlet (SOL) A unique Rivulis solution
 Drives the water straight to the plants roots, reducing evaporation and desalination.
 Use stand-alone without tube, connect direct to 3x5 tube or connect to tube using branching adaptors.

Supertif PC • Pressure compensating for accurate flow over a wide range of pressures. Flow rates: 0.58, 1.02, 2.06, 3.17, 6.60 gph	
Supertif PCND Pressure compensating no-drain dripper • Pressure compensating and no-drain function for pulse Irrigation applications and very long drip lines. Flow rates: 0.29, 0.58, 1.02, 2.06 gph	
Supertif PCND-H Pressure compensating no-drain dripper with a high sealing pressure Flow rates: 0.42, 0.82, 2.90 gph	
Supertif PCND-MOP & PCND-H-MOP Pressure compensating no-drain mechanism dripper with medium opening pressure & high sealing pressure option. Pressure compensating and no-drain with differing sealing and opening pressures to suit your unique application. PCND-MOP flow rates: 0.29, 0.58, 1.02 gph PCND-H-MOP flow rates: 0.42, 0.82, 1.40 gph	



No Drain Drippers: What You Need To Know

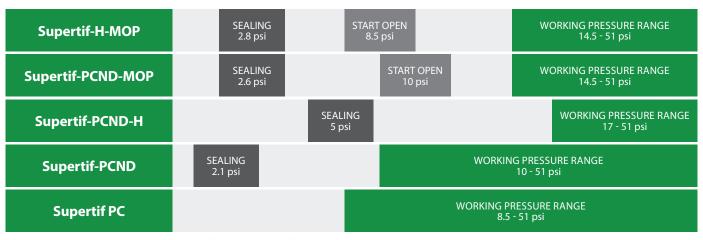
Standard Pressure Compensating (PC) drippers provide a consistent flow rate over a wide pressure range to ensure uniformity regardless of run length or elevation.

No Drain (ND) drippers take this further by also sealing when pressure falls below a specified level.

The drippers remain sealed until the pressure increases above a specified pressure – within the working pressure range.

The benefit of ND is that it keeps the pressure in the tube when the dripper is turned off enabling you to pulse irrigate. Without this feature, the system would drain at shut-off and would need to re-fill at each operation and water retribution along the irrigation flow will not be even.

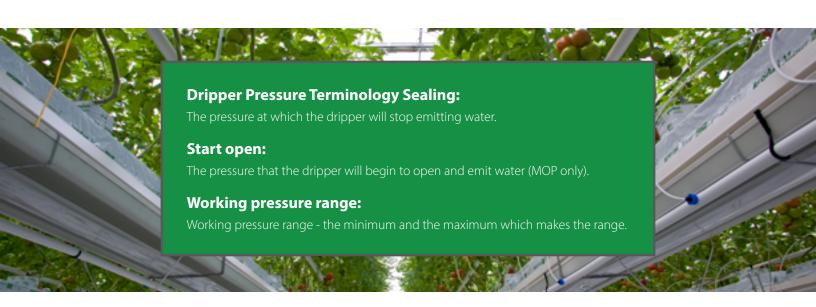
Quick Reference Pressure Chart for Supertif Drippers



1.4 2.1 2.8 3.5 4.3 5 5.7 6.3 7.1 7.8 8.5 9.2 10 10.7 11.4 12.1 12.8 13.5 14.2 15.6 17.1 18.5 19.9 21.3 28.4 35.5 42.6 51

Pressure (psi)

The table above is for use as a general guide. Please consult your Rivulis representative for the exact performance specifications of each dripper.



Rivulis E1000: Easy Take-Apart Dripper

Cost Effective

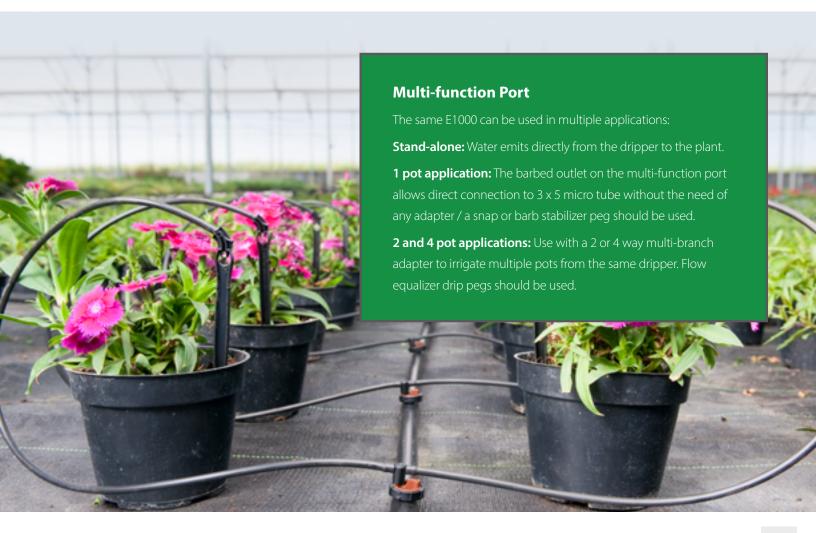
The Rivulis E1000 is a cost-effective dripper that that can be used standalone or also with tube and pegs. Available in flow rates of 0.53, 1.06, 2.11gph (calculated at 14.5 psi).

Alternatively, you may choose to use overhead irrigation for all your irrigation requirements. However this is only suitable for specific crops that are durable to fungus and pests.

Easy Cleaning

Every pack of 1,000 drippers comes with a useful E1000 spanner. This specially designed spanner allows you to open your E1000 dripper with ease. Once open, you have full access to the flow labyrinth allowing you to easily clean the dripper.

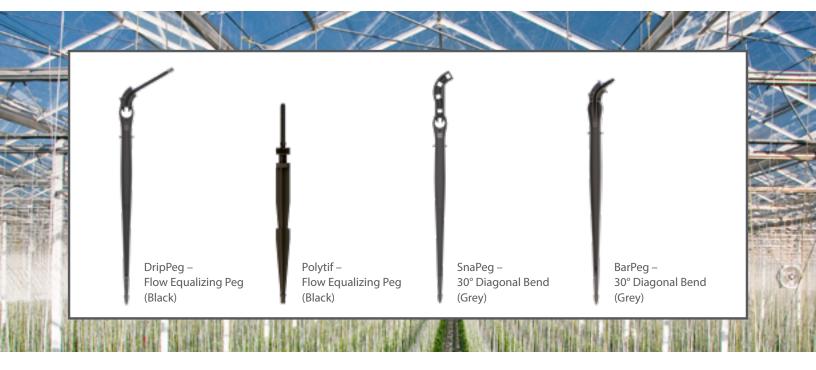




Dripper Pegs: Choosing The Correct Option

If you have more than one peg and tube per dripper, it is necessary to use an equalizer DripPeg that also has flow regulation built in.

This reduces the risk that if one peg is lower than the other, it will expel more water than pegs at higher elevation. Therefore, when using multiple pegs per dripper, you should use DripPeg or Polytif which both have built in flow regulation.



Supertif Applications with Dripper Pegs



Above is an example of using the Supertif Multi Outlet with DripPegs



Above is an example of using the Supertif Single Outlet with SnaPeg

Rivulis White Drip Line Solutions

Why consider using white drip line in your greenhouse?

White drip line or tube dramatically reduces the water temperature being delivered to the plants. This lower water temperature can significantly benefit crops, particularly young plants where feeder roots are more sensitive to water temperature.

In addition, because the water temperature is lower, scaling is reduced, which reduces the risk of dripper clogging, and ultimately increases the lifespan of the drip line.

In a field study comparing white drip lines to black drip lines, the water coming out of the white drip line was 50°f lower than the water from the black drip line.

Rivulis white tubing is used in greenhouses, climate control and overhead irrigation systems. White tubing is available in 1/2", 3/4", and 1". All Rivulis white tubing is produced using multi-layer technology with a black internal tube layer to prevent algae build-up.



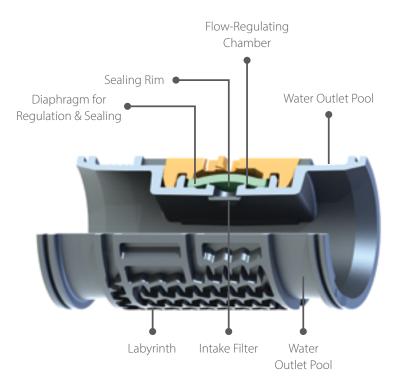
Rivulis White Hydro PCND

The Rivulis White Hydro PCND drip lines are the ideal solution for growing in both soil or soilless applications.

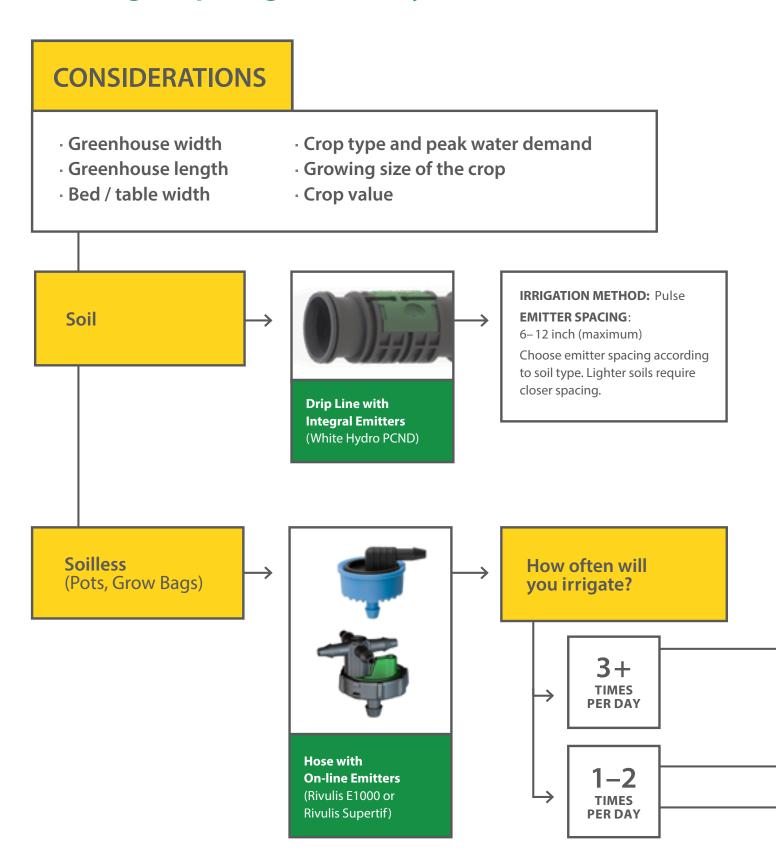
The benefits include:

- Strong round dripper with two outlets in every dripper.
- Pressure compensating for same flow per dripper.
- Hydro PCND 1/2" and 3/4" no-drain option available to stop water emitting at system shut-off (1.42 psi sealing pressure) enabling for pulse irrigation with a large diameter drip line.
- Hydro PCND is the leading soilless irrigation solution for growing in media channels.

Hydro PCND Dripper



Choosing Drip Irrigation for your Greenhouse



How many pots per dripper?



Pressure Compensanting & No Drain (Supertif PCND) Drippers (Rivulis Supertif ND or Eurodrip Corona ND)

The dripper seals when pressure falls below a specified pressure to stop water draining out of the tube at shut-off. The water stays in the tube and therefore allows you to irrigate in pulses with no drainage.

When it comes to ND drippers, you need to consider: what pressure should the dripper turn on (open) and what pressure should the dripper turn off (seal).

i.e. Supertif NDH has a sealing pressure of 5 psi and an opening pressure of 7 psi.

There are many PCND models available. Consult your local Rivulis representative to determine the configuration best-suited for your application.



PC Dripper (Rivulis Supertif) For constant flow over a wide range of pressure.



Non-PC Dripper (Rivulis E1000)

Economical solution with take-apart body.

CONSIDERATIONS:

- Crop value high value crops should have one dripper per pot.
- Total flow required if you have multiple pots per dripper, you need to ensure that each pot still receives enough water.



MULTI-POT

Connect Using
Single Hose
SnaPeg or BarPeg*



Connect Using Manifold & Flow Equalizing PEGS DripPeg or Polytif*

Flow equalizing pegs helps each plant receive the same amount of water, through an equalizing mechanism in each peg.



* SnaPeg, BarPeg, DripPeg and Polytif are suitable for E1000 and Supertif only.

For pegs and manifolds, please contact your local representative or dealer.

Climate Control: Rivulis FLF Foggers

Rivulis FLF foggers, available in 1, 2 and 4 outlet options, provide the ultimate solution to increase humidity and lower ambient temperatures in your greenhouse.

Each nozzle is available in 1.5 gph and 31 gph (51 psi) models. This provides a maximum flow of 6.1 or 11.3 gph for the 4×1.5 gph nozzle option.

The average FLF droplet size is 200 mesh resulting in a fine mist that evaporates quickly.



.5 gph





h 6.1 / 11.3 gph



Germination & Overhead Irrigation

For greenhouses, even with drip irrigation, an overhead irrigation system including mist sprayers and/or micro sprinklers is often needed for germination, chemigation and sometimes as supplementary irrigation.

Note, you may choose to use overhead irrigation for all of your irrigation requirements; however, this is only suitable for specific crops that are durable to fungus and pests.

Mist Sprayers: Rivulis Rondo Mist Sprayer for Fine Seed Germination

If you are growing from fine seeds, it is best to use a mist sprayer in order to protect seeds from large droplets of conventional mini sprinklers.

A mister differs from a micro sprinkler by spreading very fine drops without a spinner. Each droplet is approximately 150 microns in size, which is distributed in a uniform pattern of 6.5 feet on average. Rondo Mist Sprayers deliver 12.5 to 16 gph of water (at 43.5 psi).



Depending on the application, misters can also be used for humidification and evaporative climate control in greenhouses.



Micro Sprinklers: Rivulis Rondo-Inverted Application

The Rondo Micro Sprinkler is one of the most trusted sprinklers worldwide.

Did you know that the Rondo is also available in an inverted model, designed specifically for greenhouse irrigation? Available in a range of flow rates from 8 to 79 gph (29 psi) and two different spinner options (flat and convex), Rondos can be customized to irrigate 16 -35 ft diameter per sprinkler.



Provides a larger wetted diameter allowing for larger distance between sprinklers. However if using convex trajectory spinners, you will need to suspend the sprinkler down at least 2 ft to prevent droplets from hitting the greenhouse roof. Water droplets are spread horizontally from the sprinkler head. This enables the sprinkler to be suspended higher while decreasing the diameter of each sprinkler. This is mostly recommended for the greenhouse edges where less wetting of the plastic is required, or shorter wetting diameter is required. Note: PC Rondo models are only available with flat trajectory spinners.

Climate Control: Humidity & Cooling

Greenhouses are designed to provide a mico-climate providing the optimal temperature needed to accelerate plant growth and provide versatility of crop growth without being restricted by the outside climate or relative humidity.

The correct environment is critical for healthy plant growth. This environment can be achieved through the use of foggers that distribute fine water droplets into the air.

When foggers are used, they help increase the humidity in the air while also lowering the overall temperature in the greenhouse. Use foggers to reduce the air temperature and/or to increase the air humidity

Create the Best Environment For Healthy Plant Growth with Foggers

• The correct environment is critical for healthy plant growth. This environment can be achieved through the use of foggers that distribute fine water droplets into the air.

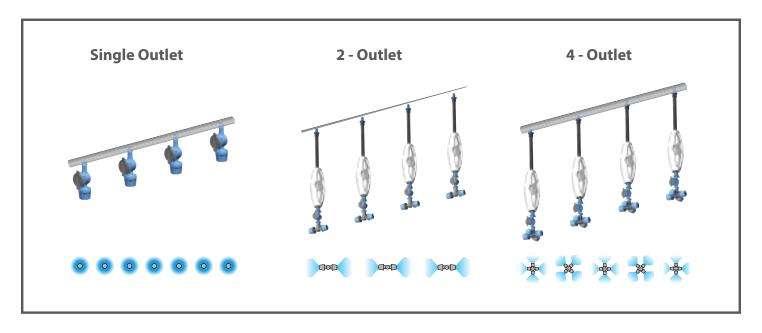


Installation Considerations

To make sure that plant's stay dry during the foggers activity., foggers should be installed in the highest position possible, ideally above the path. By calculating distance x temperature x humidity, it is possible to calculate the falling distance required for drops to evaporate. This helps minimize the risk of plant disease. The efficiency of a cooling system is subject to the relative humidity. The most common configuration for standard applications is 10 x 6.5 ft (4 outlet option), however your Rivulis representative can assist you with calculating the FLF requirements for your greenhouse.



FLF Options: 1, 2 & 4 Way Outlets



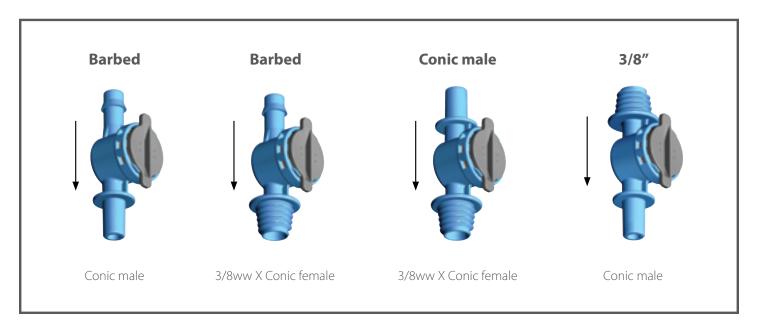
Benefits of Anti-Leak Mini Valves

The primary benefit of anti-leak valves is that they keep the system pressurized at shut-off.

After a shift is complete, the pressure will fall and the anti-leak valve will seal. This enables pulse irrigation because the system does not need to refill.

Another major benefit of anti-leak valves is that water will not drain, which could damage the crop below it.

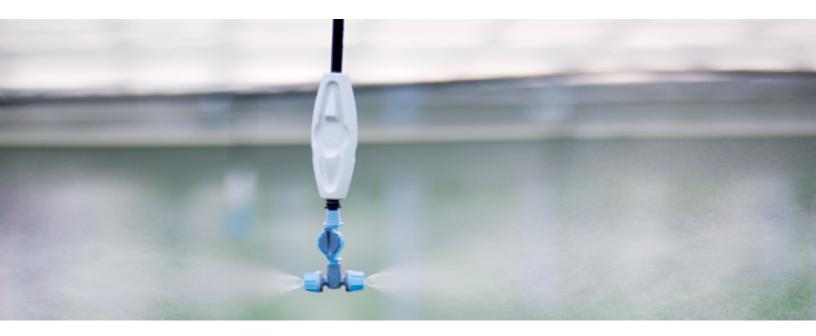
Rivulis anti-leak valves are suitable for a wide range of Rivulis misters, sprinklers and foggers.



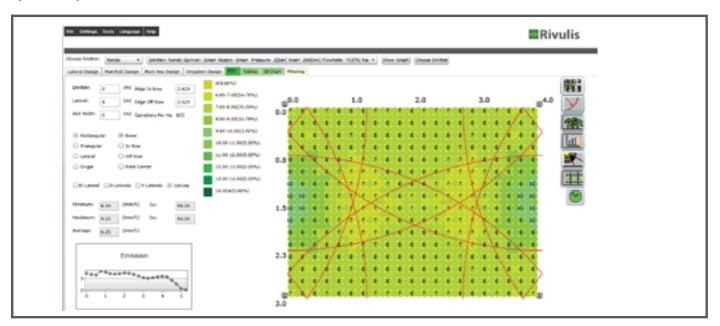
Design: Sprinklers, Misters & Foggers

When designing for sprinklers, you are measuring the coefficient of uniformity which is a 3D analysis where you want to achieve minimum 90% uniformity over the total area. This analysis includes the effect of sprinkler overlap.

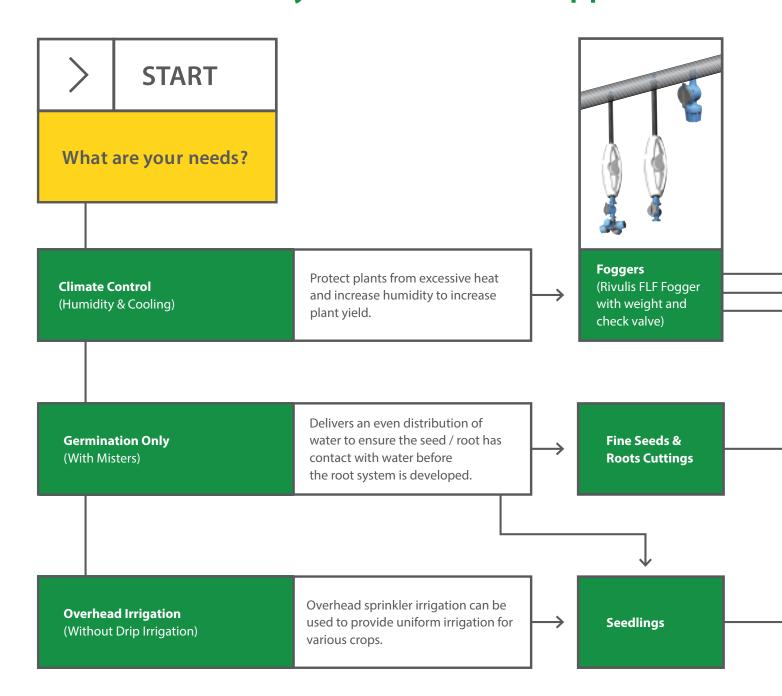
When designing for drip, you are most commonly designing to minimize flow variation to 10% along each row. Effectively this is a two-dimensional analysis. Our team at the Rivulis global design centers have the expertise to help you design the sprinkler system for your greenhouse.

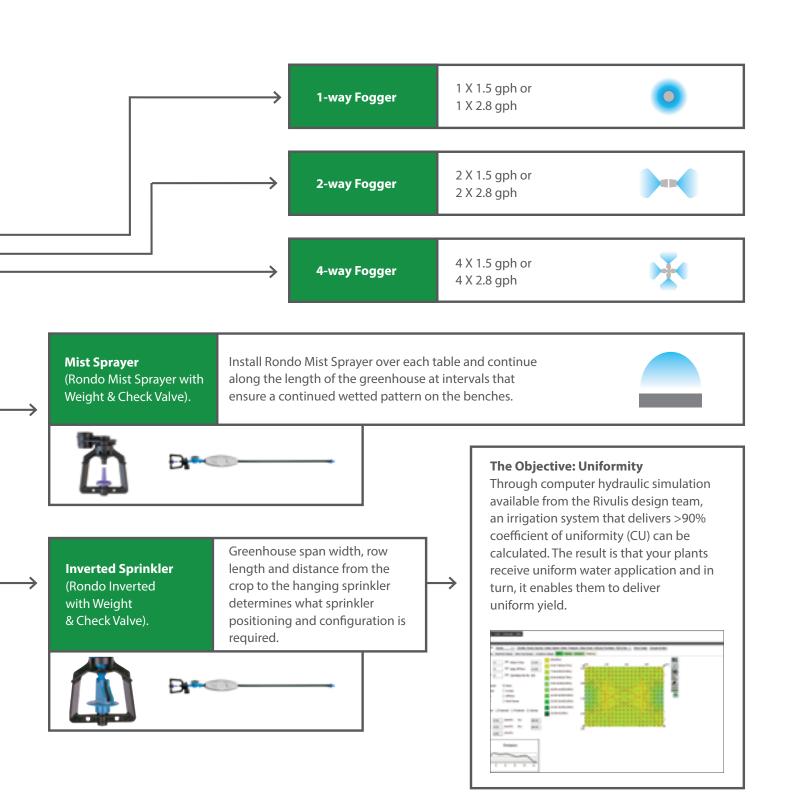


Rivulis Hydraulic Design Tool software (Every Drop Counts) is used to calculate uniformity and optimize sprinkler placement.



Choosing Overhead Irrigation / Climate Control for your Greenhouse Application







Rivulis S5000, S6000 and SuperXL Sprinklers

Rivulis S5000 & S6000 Plastic Impact Sprinkler

A plastic impact sprinkler that sets itself apart with a stainless steel spring, high quality movement and a balanced mechanism. The Rivulis S5000 and S6000 sprinklers are equipped with state-of-the-art nozzles that provide perfect water distribution and uniformity.

Flow rates:

- S5000 Low Angle: 99 168 (36 psi) 1 nozzle
- S5000 High Angle: 103 374 (36 psi)
 1 and 2 nozzle options
- S6000 High Angle: 317 687 (435 psi) 2 nozzles





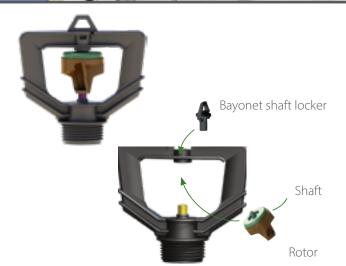


Rivulis SuperXL Silicone Drive Sprinkler

The Super XL is a slow-rotating rotor sprinkler that sprays a single continuous stream of water reaching up to 56 feet in diameter. The solid single stream makes the SuperXL very effective for use in greenhouse roof applications and for sensitive crop irrigation.

Flow rates:

• 50.5, 62, 77, 90 gph (36 psi)



Product Information

Supertif PC Flow Product **Outlet Type Outlet Color** (gph) Color Number Brown 0.58 201015523 Conic + Barb - for use with single, Black 1.02 201015524 2 & 4 way branching adaptors (min. flow per outlet - 0.5 gph Black Green 2.06 201015525 max. flow per outlet - 0.9 gph) Or connect straight barbed to 201015526 Red 3.2 3 x 3 mm tube Orange 6.6 201015527

Pressure compensating | Operating pressure range: 8.5 -51 psi (6.60 gph model: 14.5-51 psi) | Install with 2 mm punch tool

Supertif PCND				
Outlet Type	Outlet Color	Flow (gph)	Base Color	Product Number
Conic + Barb – for use with single, 2 & 4 way branching adaptors (min. flow per outlet – 0.5 gph max. flow per outlet – 0.9 gph) Or connect straight barbed to 3 x 3 mm tube	Light Gray	0.29		201015528
	Brown	0.58		201015531
	Black	1.02	Brown	201015533
	Green	2.06		201015534
SOL – 90° Side barbed for 3 x 5 mm tube	Brown	0.58		101003191

Pressure compensating, no-drain | Operating pressure range: 10-51 psi | Sealing pressure: 2 psi | Install with 2 mm punch tool

ND SOL 1.1 - 101003187 ND SOL 3.85 - 101003195



Supertif PCND-H

Outlet Type	Outlet Color	Flow (gph)	Base Color	Product Number
Conic + Barb – for use with single, 2 & 4 way branching adaptors (min. flow per outlet – 0.5 gph max. flow per outlet – 0.9 gph) Or connect straight barbed to 3 x 3 mm tube SOL – 90° Side barbed for 3 x 5 mm tube	Dark Gray	0.42	Brown	201015529
	Blue	0.82		201015532
	Red	2.9		201015535
	Dark Gray	0.42		101011756
	Blue	0.82		101011757



Pressure compensating, no-drain high sealing pressure | Operating pressure range: 17 - 51 psi | Sealing pressure: 5 psi | Install with 2 mm punch tool

Supertif PCND-MOP & PCND-H-MOP

Outlet Type	Outlet Color	Flow (gph)	Base Color	Product Number
	Light Gray	0.29	Light Blue	101003189
	Dark Gray *	0.42		101003185
SOL – 90° Side barbed for 3 x 5 mm tube	Brown	0.58		101018411
	Blue *	0.82		101003193
	Black	Black 1.02		101003196
Conic + Barb – for use with single, 2&4 way	Dark Gray **	0.42		201015537
branching adaptors (min. flow per outlet – 6.6 gph, max. flow per outlet – 0.53 gph) Or connect straight barbed to 3 x 3 mm tube	Blue ***	0.82	Blue	201015539
	Violet ***	1.4		201015540



Operating pressure range: 14.5 -51 psi | Sealing pressure: 2.6 psi | Start opening pressure: 10 psi | Install with 2.0 mm punch tool

- * Sealing pressure: 8.7 ≈ 9 psi
- ** Start opening pressure: 8.7 ≈ 9 psi
- *** Operating pressure range: 19 51 psi

Supertif Dripper Vacuum (Outlet Color: Green, Product Number 101003200) is for upper side of ND systems as a vacuum breaker).

E1000 Dripper

Outlet Type	Outlet Color	Flow (gph)	Product Number
M le C e e	Brown	0.53	201013383
Multi-function outlet for use with single, 2 & 4 way branching adaptors	Black	1.06	201013385
	Green	2.11	201013386



Flow rates calculated at: 14.5 psi | Operating pressure range: 12 -29 psi | Install with 2 mm punch tool

Rivulis Dripper Accesso	ries	
Description	Product Information	Product Number
Tube		
Rolls of 3 x 5 tube & pre-punched LDPE a	ire available	
Plugs		
Plug 2 mm		101003314
Tools		
2 mm Punch Tool	Suitable for E1000 & Supertif drippers	101001967
2.8 mm Mini Punch		101003347
Multi Adaptors		
Start Adaptor		101003297
1 Way Angled Adaptor (barb)	Suitable for 2 v.E. tubing	201000237
2 Way Adaptor (barb)	Suitable for 3 x 5 tubing	101003301
4 Way Adaptor (barb)		101003302
Pegs		
DripPeg – Flow Equalising Peg (black)	For multiple-outlet drippers	101003308
SnaPeg – 30° Diagonal Bend (grey)	For single-outlet drippers	201000247
BarPeg – 30° Diagonal Bend (grey)	For single-outlet drippers	101008233
Polytif – Flow Equalising Peg (black)	For multiple-outlet drippers	201000076



Rondo Mist Sprayer Head

Flow Rate @ 3.0 bar	Nozzle Color	Wetting Diameter (m)	Product Number
12.5	Black	6.5	201000281
16	Blue	6.5	101022981



Inverted Rondo					
Flow Rate (gph) @ 29 psi for non-flow reg models	Spinner	Nozzle	Pressure Compensating	Wetting Diameter (ft) 6.5 ft Above Ground @ .29 psi	Product Number
13.5		Blue		26	101011800
20	Blue	Green		28	201000123
27	(Flat Trajectory)	Red		31	101011801
35		White	X	31	201000124
13.5		Blue	, X	28.5	101011803
20	Green	Green		32	201000126
27	(Convex Trajectory)	Red		35	101011804
35		White		35.5	101011805



Operating pressure range: 22 - 43.5 psi | Flow rate calculated at 29 psi | Wetting diameter: 16 - 35 psi, according to Flow Rate and Spinner | Inlet: Conic female / 3/8"THM depending on product

Rondo Accessories

Description	Product Number
Anti-Leak Valve (Conic Female x Conic Male) – suitable for Inverted Rondo	201000202
Anti-Leak - Mini Valve (Barbed x Conic Male) – suitable for Inverted Rondo	201000204
Weight for hanging tube	101003723
35 cm tube, Weight and 4/7 x Male Press Fit Connector Assembly	201000260
35 cm tube, Weight and 4/7 x Male Press Fit Connector Assembly	101003694
Meteor 44 (3/8"THF x 4/7mm)	201000822









FLF			
Flow rate per outlet (gph)	Inlet	Color	Product Number
1.5	Doub	Light Blue	201000197
2.8	Barb	Dark Blue	101003674
1.5	Mala Cania	Light Blue	101003679
2.8	Male Conic	Dark Blue	101003680
1.5		Light Blue	101008234
2.8	Female Conic	Dark Blue	101009818
1.5	remaie Conic	Light Blue	101003664
2.8		Dark Blue	101009819







Operating pressure range: 51 - 72 psi | Flow rate calculated at 51 psi | Inlet: Conic female or barb | All models of FLF-1 outlet come pre-installed with anti-leak valve. Operating pressure range: 36 - 58 psi | Flow rate calculated at 43.5 psi | Inlet: Conic female

Anti-Leak Valves	
Description	Product Number
Anti-Leak Valve – High Pressure (conic x thread)	201000833
Anti-Leak Valve – High Pressure (thread x conic)	201000236
Anti-Leak Valve – High Pressure (barb x conic)	201000832



Quick Reference Guide: Drippers					
Dripper Type	Supertif	Supertif ND	Supertif NDH	Supertif ND MOP	
Pressure Compensating	~	~	~	✓ <	
No-drain	X	✓	(high sealing pressure)	(medium opening sealing pressure option)	
Flow Rates (gph) Based on nominal operating pressure	0.58, 1.02, 2.06, 3.2, 6.6	0.29, 0.58, 1.02, 2.06	0.42, 0.82, 1.02, 2.06	0.29, 0.58, 1.02, 1.4	
Operating Pressure (psi)	Conic + Barb - for use with branching adapters or connect direct to 3 x 5 mm tube				
Outlet Type	Conic + Barb - for use with branching adapters or connect direct to 3 x 5 mm tube				
	SOL (selected configurations) 90° barbed side for 3 x 5 mm tube				
Features	Self-activated Self-activated flushing mechanism with no-drain flushing feature to prevent water draining from drippers mechanism when water is shut-off				

Quick Reference Guide: Greenhouse Sprinklers				
Dripper Type	Inverted Rondo	FLF	Rondo Mist Sprayer	Tornado Mist Sprayer
Туре	Inverted Micro Sprinkler	Inverted Fogger	Inverted Mister	Inverted mister
Pressure Compensating	X	X	X	X
Flow Rate (gph) Based on nominal operating pressure	13.5, 20, 27, 35	1.5, 3.1	10.5, 13.9	6.1, 7.4, 10.6, 13.2
Operating Pressure (psi)	22 - 36	51 - 70	36 - 58	22 - 36
Inlet	Conic female	Conic female	Conic female	Conic female
Options / Models	Anti-leak valve assembly	Single, 2-way & 4-way models. Anti-leak valve assembly	Anti-leak valve assembly	Anti-leak valve assembly

Case study outcomes are for information purposes only and actual results may vary. This literature has been compiled for circulation in USA, Mexico and Canada. Descriptions, photos, and information are for general purpose use only. Please consult with an irrigation specialist and technical specifications for proper use of Rivulis products. Because some products are not available in all regions, please contact your local dealer for details. Rivulis reserves the right to change specifications and the design of all products without notice. Every effort has been used to ensure that product information, including data sheets, schematics, manuals and brochures are correct. However information should be verified before making any decisions based on this information. 071519

