Specifications

The irrigation system controller shall be of a hybrid type that combines electro-mechanical and microprocessor-based circuitry capable of fully automatic and manual operation.

The controller shall operate on a 117 VAC ± 10% power input and be capable of actuating up to two 24 VAC, 7VA solenoid valves per station plus a master valve or pump start relay. The controller shall be capable of operating four stations plus the master valve simultaneously. Controller output shall be protected against severe electrical surge.

The controller shall have four separate irrigation programs (A, B, C, & D) which can have different start times, watering days, day cycles, and station timing. Each program shall have eight start times per day.

The controller shall have _____ stations, with each station capable of an operating time of 0 to 2 hours in one-minute increments and 2 to 12 hours in 10-minute increments. Controller station operation shall be of automatic sequential stacking to avoid overlapping operation unless programmed to overlap.

The controller shall have a 365-day calendar with day-of-the-month OFF feature. Programs will run on an ODD/EVEN day cycle, day-of-the-week ON/OFF cycle, or in cycles from 1 to 99 days. In addition, the controller shall have a programmable rain shut-down from 1 to 99 days.

The controller shall have two master valve/remote pump start circuits for use with a master valve to pressurize the system when the irrigation cycle starts or to activate a remote pump start relay to run the pump during the irrigation cycle. One master valve/pump start circuit shall be programmable by station; the other shall function whenever a station is active.

The controller shall be capable of being operated manually at any time. A manual single station, a group of stations, or a program can be selected to run for the programmed time without affecting the normal program. This controller shall be capable of running a variable system test program without affecting the normal program.

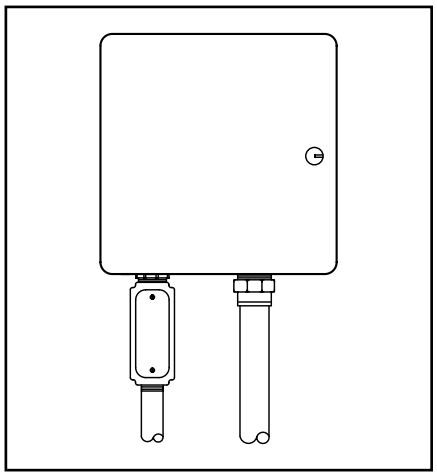
The controller shall be upgradeable by use of a Maxicom^{2}™ Interface Board.

The controller shall have Cycle+Soak™ water management software which is capable of operating each station for a maximum cycle time and a minimum soak time to reduce water run-off and puddling. The maximum cycle time shall not be extended by water budgeting.

The controller shall include a feature that allows the setting of a delay between station operation. This delay shall be set by program. This delay must be able to be set from 0 seconds to 9 hours.

The controller shall have an internal non-volatile memory which will retain the irrigation program and the programmed date and time for a minimum of 100 years without power. A 9 VDC rechargeable battery and recharging circuit shall also be included for counting down the program-in-progress during a power outage and shall allow programming of the controller when it is disconnected from the main power supply.

There shall be a station status indicator light and a master valve status indicator light. These lights will indicate station operation and circuit integrity. An indicator for sensor status will be found on the front panel along with a switch to suspend sensor operation.



This indicator and override will work with a sensor wired to the controller's sensor terminals.

The controller shall be available in a 16-guage seamless steel cabinet suitable for wall-mounting, a NEMA 4 rated plastic cabinet suitable for wall-mounting, or a stainless steel pedestal mounting.

The controller shall be Year 2000 compliant.

The controller shall be as manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California.

Rain Bird Sales, Inc.
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Rain Bird Technical Service
800 247-3782 (U.S. only)

http://www.rainbird.com

RAIN BIRD®

TECH SPECS

PEB and PESB Series Valves

Durable valves. Patented technology.

Pressure surges? Effluent water? Clogging debris? No problem. PEB and PESB Series valves offer long life and efficient, trouble-free performance—even under harsh conditions. Constructed of heavy-duty, glass-filled nylon, these valves resist clogging. And the PESB model features a patented scrubber to actively fight dirt, debris and particles.

Features

- Durable glass-filled nylon construction for long life and heavy-duty performance at 200 psi (13,80 bars) pressure.
- Stainless steel studs molded into the bonnet. Bonnet can be attached and removed more easily and more often without damaging threads.
- One-piece solenoid design with captured plunger and spring for easy servicing. Prevents loss of parts during field service.
- External bleed does not allow debris to go through the solenoid ports when system is flushed.
- Internal bleed operates the valve without allowing water into the valve box; allows pressure regulator to be adjusted without turning on the valve at the controller first.
- Low flow operating capability (0.25 gpm; 0,06 m³/h; 0,02 l/s) for a wide range of applications. For flows below 3 gpm (0,75 m³/h; 0,21 l/s) or any Xerigation® application, install Rain Bird Y filter upstream.
- Slow closing to prevent water hammer and subsequent system damage.
- **PESB only:** Nylon scrubber scrapes its stainless steel screen clean to break down grit and plant material. Prevents debris build-up and clogging.

Options (order separately)

- Accommodate optional, field installed PRS-D pressure regulating module to ensure optimum sprinkler performance.
- Optional purple flow control handles for non-potable water applications
  PEB-NP-HAN1(1")
  PEB-NP-HAN2 (1½" and 2")
- Accepts latching solenoid for use with Rain Bird battery-operated controllers up to 150 psi (10,35 bars).

Operating Range

- Pressure: 20 to 200 psi (1,38 to 13,80 Bars)
- Flow: 0.25 to 200 gpm (0,06 to 45,40 m³/h; 0,02 to 12,60 l/s)
- Flow with PRS-D: 5 to 200 gpm (1,14 to 45,40 m³/h; 0,32 to 12,60 l/s)
- Temperature: up to 150° F (66° C)

Electrical Specifications

- Power: 24 VAC 50/60 cycle solenoid
- Inrush current: 0.41 A (9.9 VA)
- Holding current: 0.23 A (5.5 VA)

Models

- 100PEB and 100PESB 1" (26/34)
- 150PEB and 150PESB 1½" (40/49)
- 200PEB and 200PESB 2" (50/60)

BSP threads available, specify when ordering.

Pressure Loss (psi)

gpm	100 - 1"	150 - 1½"	200 - 2"
0.25	0.8	0.06	0.02
0.5	1.0	-	-
1	1.3	-	-
5	1.7	-	-
10	1.8	-	-
20	2.9	4.0	-
30	5.6	3.6	-
40	10.0	2.7	-
50	15.6	2.4	3.1
75	-	4.2	2.9
100	-	8.5	3.9
125	-	14.6	6.8
150	-	21.2	10.0
175	-	-	13.6
200	-	-	17.5

Pressure Loss (bars)

m³/h	l/s	100 - 1"	150 - 1½"	200 - 2"
0,06	0,02	0,05	-	-
1	0,28	0,11	-	-
2	0,56	0,12	-	-
3	0,83	0,15	-	-
4	1,11	0,18	-	-
5	1,39	0,24	0,27	-
6	1,67	0,32	0,26	-
7	1,94	0,41	0,24	-
8	2,22	0,54	0,21	-
9	2,50	0,68	0,19	-
10	2,78	0,84	0,18	-
12	3,33	-	0,18	0,21
14	3,89	-	0,22	0,21
16	4,44	-	0,26	0,20
22	6,11	-	0,55	0,26
28	7,78	-	0,98	0,46
34	9,45	-	1,46	0,69
40	11,11	-	-	0,95
45	12,50	-	-	1,18

Notes

1) Loss values are with flow control fully open.

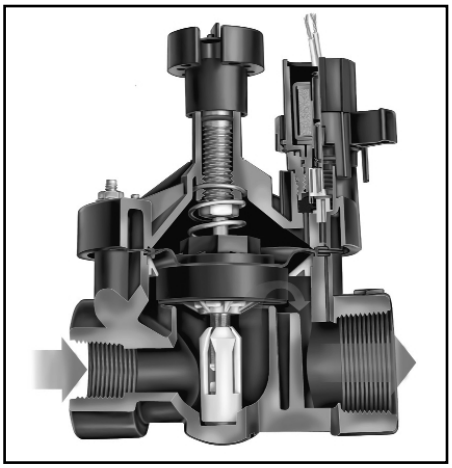
2) PRS-D module recommended for use below bold line.

Recommendations

1) Rain Bird recommends flow rates in the supply line not to exceed 7.5 ft./sec. (2,29 m/s) in order to reduce the effects of water hammer.

2) For flows below 5 gpm (1,14 m³/h; 0,32 l/s), Rain Bird recommends use of upstream filtration to prevent debris from collecting below the diaphragm.

3) For flows below 10 gpm (2,27 m³/h; 0,63 l/s) Rain Bird recommends the flow control stem be turned down two full turns from the fully open position.



Dimensions

Size	Height	Length	Width
100	6½"(16,5 cm)	4" (10,2 cm)	4" (10,2 cm)
150	8" (20,3 cm)	6" (15,2 cm)	6" (15,2 cm)
200	8" (20,3 cm)	6" (15,2 cm)	6" (15,2 cm)

Note: The PRS-D option adds 2" (5,1 cm) to valve height.

How to Specify

100-PEB-PRS-D

Size	Model	Optional Feature
100: 1"	PEB	PRS-D: pressure regulating module
150: 1½"	PESB: scrubber model	
200: 2"		

Note: Valve and PRS-D module must be ordered separately.

Specifications

The electric remote control valve shall be a normally closed 24 VAC 50/60 cycle solenoid actuated globe pattern design. The valve pressure rating shall not be less than 200 psi (13,80 bars). The valve shall have the following characteristics (circle one):

Flow rate: _____ gpm m^3/h l/s

Pressure loss not to exceed: _____ psi bars

The valve body and bonnet shall be constructed of heavy-duty glass-filled UV-resistant nylon and have stainless steel studs and flange nuts; diaphragm shall be of nylon reinforced nitrile rubber.

The valve shall have both internal and external manual open/close control (internal and external bleed) to manually open and close the valve without electrically energizing the solenoid. The valve's internal bleed shall prevent flooding of the valve box.

The valve shall house a fully-encapsulated, one-piece solenoid. The solenoid shall have a captured plunger with a removable retainer for easy servicing and a leverage handle for easy turning. This 24 VAC 50/60 Hz solenoid shall open with 19.6 volt minimum at 200 psi (13,80 bars). At 24 VAC, average inrush current shall not exceed 0.41 amps. Average holding current shall not exceed 0.23 amps.

The valve shall have a brass flow control stem for accurate manual regulation and/or shut-off of outlet flow. The valve must open or close in less than 1 minute at 200 psi (13,80 bars), and less than 30 seconds at 20 psi (1,38 bars).

The PESB valve shall have a self-cleaning stainless steel screen designed for use in dirty water applications.

The valve construction shall be such as to provide for all internal parts to be removable from the top of the valve without disturbing the valve installation.

Optional Feature Specification

PRS-D Pressure Regulating Module:
100PEB-PRS-D 100PESB-PRS-D
150PEB-PRS-D 150PESB-PRS-D
200PEB-PRS-D 200PESB-PRS-D

When so indicated on the design, the 1", 1½" and 2" electric remote control plastic valves shall have a pressure regulating module (PRS-D) capable of regulating outlet pressure between 15 and 100 psi (±3 psi) (1,04 and 6,90 bars (±0,21 bars)).

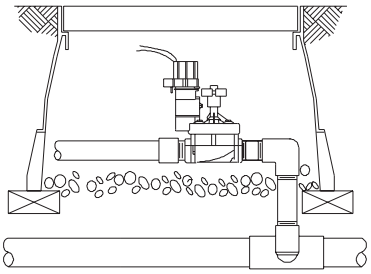
The PRS-D module shall have an adjusting screw for setting pressure and Schrader valve connection for monitoring pressure. The pressure shall be adjustable from the PRS-D when the valve is internally manually bled or electrically activated.

Non-Potable Flow Control Handle
PEB-NP-HAN1 - Fits 1"
PEB-NP-HAN2 - Fits 1½" and 2"

When so indicated on the design, the valve shall have a purple flow control handle to indicate to the user that non-potable water is being used. There shall be no difference between the black and purple handles except for the color.

The valve shall be as manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California.

Plastic Electric Remote Control PEB or PESB Valve (with PRS-D)



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Rain Bird. Conserving More Than Water.

RAIN BIRD®

TECH SPECS

PRS-Dial

Pressure Regulating Module

The PRS-Dial is an excellent means of regulating outlet pressure at the valve regardless of incoming pressure fluctuations. The visible scale makes installation quick and easy. The regulator fits all Rain Bird PGA, PEB, PESB, GB, EFB-CP, BPE and BPES series valves. The dial cartridge (sold separately) retrofits easily into existing PRS-B units.

Features

- Regulates and maintains constant outlet pressure between 15 and 100 psi (1,04 to 6,90 bars) within ±3 psi (±0,21 bars)
- Adjustment knob with detents permits fine-tune setting in ½ psi (0,02 bars) increments
- Improved spike reduction capabilities reduce water hammer
- Ergonomic design with snap-tight cover to prevent vandalism
- Waterproof dial cartridge eliminates fogging and binding
- Dial cartridge retrofits into all existing PRS-B units
- Schrader valve connects pressure hose gauge, ordered separately
- Easy field installation. PRS-Dial threads underneath the solenoid and adapter
- Corrosion-resistant glass-filled nylon for rugged performance

Operating Range

Pressure: up to 200 psi
up to 13,80 bars
Regulation: 15 to 100 psi
1,04 to 6,90 bars
Accuracy: ±3 psi (±0,21 bars)
Flow: refer to chart
Temperature: up to 150°F (66°C)

Models

- PRS-D
- Dial cartridge

Application Information

- Proper operation requires inlet pressure to be a minimum of 15 psi (1,04 bars) higher than desired outlet pressure.
- For areas with very high pressure or uneven terrain, install sprinklers with PRS pressure regulating stems or SAM check valves.
- When inlet pressure exceeds 100 psi (6,90 bars), a pressure regulating master valve or inline pressure regulator is suggested.
- Rain Bird does not recommend using the pressure regulating module for applications outside the recommended flow ranges.
- To reduce the effects of water hammer, Rain Bird recommends flow rates in the supply line not to exceed 7.5 ft/sec (2,29 m/s).
- For flows below 10 gpm (2,27 m^3/h; 0,63 l/s), Rain Bird recommends the flow control stem be turned down two full turns from the fully open position.
- For flows below 5 gpm (1,14 m^3/h; 0,32 l/s), Rain Bird recommends the use of upstream filtration to prevent debris from collecting below the valve diaphragm.

Recommended Flow Ranges

	gpm	m³/h	l/s
100PGA	5-40	1,14-9,08	0,32-2,52
150PGA	30-100	6,81-22,70	1,89-6,30
200PGA	40-150	9,08-34,05	2,52-9,45
100PEB/PESB	5-50	1,14-11,35	0,32-3,15
150PEB/PESB	20-150	11,35-34,05	3,15-9,45
200PEB/PESB	50-200	17,03-45,40	4,73-12,60
100GB	5-50	1,14-11,35	0,32-3,15
125GB	20-80	4,54-18,16	1,26-5,04
150GB	20-140	4,54-31,78	1,26-8,82
200GB	20-200	4,54-45,40	1,26-12,60
100EFB-CP	5-50	1,14-11,35	0,32-3,15
125EFB-CP	20-80	4,54-18,16	1,26-5,04
150EFB-CP	20-140	4,54-31,78	1,26-8,82
200EFB-CP	20-200	4,54-45,40	1,26-12,60
300BPE	60-300	13,62-68,10	3,78-18,90
300BPES	60-300	13,62-68,10	3,78-18,90
300BPE-MV	60-300	13,62-68,10	3,78-18,90
300BPES-MV	60-300	13,62-68,10	3,78-18,90

How to Specify

100-PESB-PRS-D

Size	Model	Optional Feature
100: 1" 150: 1½" 200: 2"	PESB	PRS-D pressure regulating module

Note: Valve and PRS-D must be ordered separately.

Specifications

The pressure regulating module shall be a two-piece device consisting of a glass-filled, UV resistant nylon housing and dial cartridge.

When so indicated on the design, the plastic or brass valve shall have a pressure regulating module (PRS-Dial) which shall have the following characteristics (circle one):

Operating pressure: _____ psi bars

Outlet pressure regulation:
between _____ and _____ psi bars

The regulator shall be installed between the plastic or brass valve bonnet and electric solenoid. The electric solenoid shall be 24 VAC 50/60 Hz solenoid and shall open with 19.6 volts minimum at 200 psi (13,80 bars). Average inrush current shall not exceed 0.41 A (9.9VA) and holding current shall not exceed 0.23A (5.5VA).

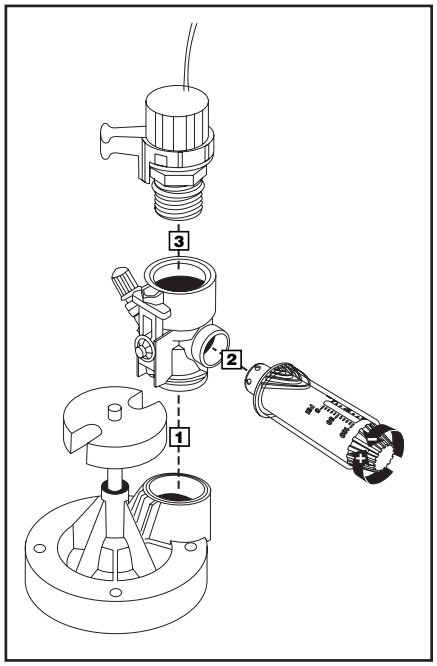
The regulator shall have a visible pressure indication scale ranging from 0-100 psi (0,0 to 6,90 bars) and an adjustment knob with detents that provide fine-tune adjustments in ½ psi (0,02 bar) increments. The protective cover shall snap tight to deter vandalism.

A schrader valve shall be installed to accommodate a pressure hose gauge for monitoring pressure.

The regulator shall be waterproof to prevent fogging the clear window and to prevent grit from binding internal components. The pressure shall be adjustable when the valve is manually internal bled or electronically activated.

The regulator construction shall be such as to provide replacing the dial cartridge without removing the regulator housing or disturbing the valve installation.

The pressure regulating module shall be manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California.



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Rain Bird. Conserving More Than Water.

Small Box Series
General Detail

Model 1419-12

1419 Polymer Concrete Cover

Weight: Polymer Concrete 17 lbs.
Part No: 1419-PR

1419 Hinged Cover

Weight: HDPE 3 lbs.
Part No: 1419-2 Non Bolt
Part No: 1419-2B Bolt Down

1419 Meter Reading Cover

Weight: HDPE 3 lbs.
Part No: 1419-5 Non Bolt
1419-5B Bolt Down
Weight: Cast Iron Reader 2 lbs.
Part No: 1419-6 Non Bolt
1419-6B Bolt Down

1419 Non Hinged Cover

Weight: HDPE 3 lbs.
Part No: 1419-3 Non Bolt
1419-3B Bolt Down
Solid Cast Iron Also Available

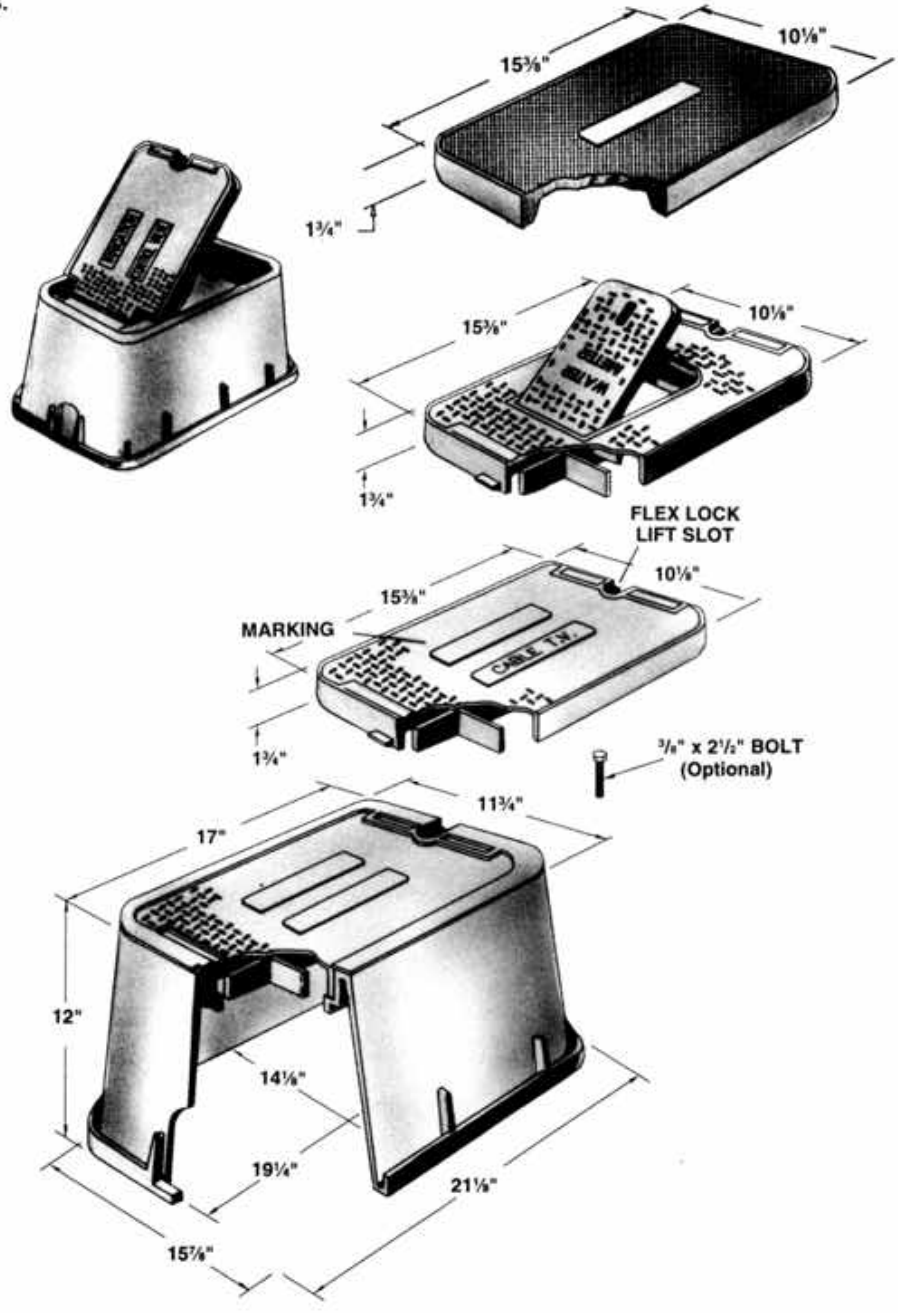
1419 T-Cover

Weight: HDPE 3 lbs.
Part No: 1419-4 Non Bolt
1419-4B Bolt Down
Solid Cast Iron Also Available

1419 Box

Weight: HDPE 7 lbs.
Part No: 1419-12

Colors Available:
Green or Grey
Black, Tan or
Violet (Reclaimed Water)
on Special Order



* NOTE: For use in non-vehicular traffic installations only. We do NOT recommend installation in concrete or asphalt.
Weights and dimensions may vary slightly.

Revision Date 1/1/98

CARSON INDUSTRIES LLC
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Toll-Free: (800) 735-5566
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Fax: (909) 592-7971

CARSON INDUSTRIES, LTD.
Roscommon, Ireland
Phone: 35 39 03-25922
Fax: 35 39 03-25921

Technical Specifications & Shipping Information

Model 1419-12

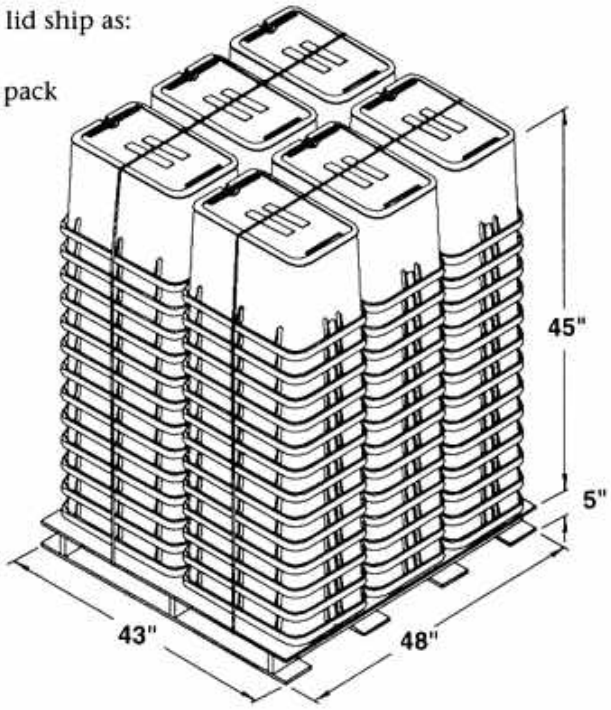
Properties of Unfoamed Resin	ASTM Test Method	HDPE
Tensile Strength	D-638	3,100-5,500 PSI
Flexural Modulus	D-790	160,000-210,000 PSI
Notched Izod Impact Strength	D-256	5-15 ft. lbs./in.
Deflection Temperature	D-648	165° to 180°F.
Density	D792	Minimum .955
Chemical Resistance	—	Excellent
Water Absorbtion	—	Nil

Static Vertical Load Rating

- Box with HDPE Cover = 350 PSF
- Box with Polymer Concrete Cover = 350 PSF

Shipping Configuration

- Units packed in cubes of 78 assemblies (cover & bodies)
- 78 pack = 53.75 cu. ft. (exclusive of pallet)
- Nests 2¾" within each other
- Units with solid cover or cover with plastic reading lid ship as: 780 lbs./78 pack (excluding pallet)
- Units with cast iron reading lid ship as: 897 lbs./78 pack (excluding pallet)



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Roscommon, Ireland
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PVC SCHEDULE 80 FITTINGS

80-2-1000

Performance Engineered & Tested

SPEARS Schedule 80 PVC fitting designs combine years of proven experience with computer generated stress analysis to yield the optimum physical structure and performance for each fitting. Material reinforcement is uniformly placed in stress concentration areas for substantially improved pressure handling capability. Resulting products are subjected to numerous verification tests to assure obtaining the very best PVC fittings available.

Full 1/4" Through 12" Availability

Spears comprehensive line of injection molded PVC fittings offers a variety of configurations in molded Schedule 80 sizes 1/4" through 12" conforming to ASTM D 2467 and Spears exclusive CL150 Flanges in sizes 1/2" through 16".

Exceptional Chemical & Corrosion Resistance

Unlike metal, PVC fittings never rust, scale, or pit, and will provide many years of maintenance-free service and extended system life.

High Temperature Ratings

PVC thermoplastic can handle fluids at service temperatures up to 140° F (60°C), allowing a wide range of process applications, including corrosive fluids.

Lower Installation Costs

Substantially lower material costs than steel alloys or lined steel, combined with lighter weight and ease of installation, can reduce installation costs by as much as 60% over conventional metal systems.

Higher Flow Capacity

Smooth interior walls result in lower pressure loss and higher volume than conventional metal fittings.

Additional Fabricated Configurations through 36"

Extra large, hard-to-find, and custom configurations are fabricated from NSF Certified pipe. Fittings are engineered and tested to provide full pressure handling capabilities according to Spears specifications.

Advanced Design Specialty Fittings

Spears wide range of innovative, improved products include numerous metal-to-plastic transition fittings and unions with Spears' patented stainless steel reinforced (SR) plastic threads.

PVC Valves

SPEARS PVC Valve products are available for total system compatibility and uniformity; see SPEARS' THERMOPLASTIC VALVES PRODUCT GUIDE & ENGINEERING SPECIFICATIONS (V-4).

MADE IN THE U.S.A. WITH PRIDE

LPCB LOSS PREVENTION CERTIFICATION BOARD — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Quality Systems Certificate No. 293
Corporate Facilities, Sylmar, CA
Assessed to ISO 9001

Sample Engineering Specifications

All PVC Schedule 80 fittings shall be produced by Spears Manufacturing Company from PVC Type I, cell classification 12454, conforming to ASTM Standard D 1784. All injection molded PVC Schedule 80 fittings shall be Certified for potable water service by NSF International and manufactured in strict compliance to ASTM D 2467. All fabricated fittings shall be produced in accordance with Spears General Specifications for Fabricated Fittings. All PVC flanges shall be designed and manufactured to meet CL150 bolt pattern per ANSI Standard B16.5 and rated for a maximum internal pressure of 150 psi, non-shock at 73°F.

PVC Thermoplastic Pipe Temperature Pressure De-Rating

System Operating Temperature °F (°C)	73 (23)	80 (27)	90 (32)	100 (38)	110 (43)	120 (49)	130 (54)	140 (60)
PVC	100%	90%	75%	62%	50%	40%	30%	22%

NOTE: Valves, Unions and Specialty Products have different elevated temperature ratings than pipe.

PVC Basic Physical Properties

Properties	ASTM Test Method	PVC
Mechanical Properties, 73°F		
Specific Gravity, g/cm^3	D 792	1.41
Tensile Strength, psi	D 638	7,000
Modulus of Elasticity, psi	D 638	440,000
Compressive Strength, psi	D 695	9,000
Flexural Strength, psi	D 790	13,200
Izod Impact, notched, ft-lb/in	D 256	.65
Thermal Properties		
Heat Deflection Temperature, °F at 66 psi	D 648	165
Thermal Conductivity, BTU/hr/sq ft/°F/in	C 177	1.2
Coefficient of Linear, Expansion, in/in/°F	D 696	3.0 x 10^{-5}
Flammability		
Limiting Oxygen Index, %	D 2863	43
UL 94 Rating	94V-0	
Other Properties		
Water Absorption, % 24 hr.	D 570	.05
Industry Standard Color	White / Dark Gray	
ASTM Cell Classification	D 1784	12454
NSF Potable Water Approved	Yes	

PVC Chemical Resistance

PVC is generally inert to most mineral acids, bases, salts and paraffinic hydrocarbon solutions. For more information on PVC chemical resistance refer to the Chemical Resistance of Rigid Vinyls Based on Immersion Test, published by the GEON® company.

NOT FOR USE WITH COMPRESSED AIR OR GASES

Spears Manufacturing Company DOES NOT RECOMMEND the use of thermoplastic piping products for systems to transport or store compressed air or gases, or the testing of thermoplastic piping systems with compressed air or gases in above and below ground locations. The use of our product in compressed air or gas systems automatically voids any warranty for such products, and its use against our recommendation is entirely the responsibility and liability of the installer.

WARNING: DO NOT USE COMPRESSED AIR OR GAS TO TEST ANY PVC OR CPVC THERMOPLASTIC PIPING PRODUCT OR SYSTEM, AND DO NOT USE DEVICES PROPELLED BY COMPRESSED AIR OR GAS TO CLEAR SYSTEMS. THESE PRACTICES MAY RESULT IN EXPLOSIVE FRAGMENTATION OF SYSTEM PIPING COMPONENTS CAUSING SERIOUS OR FATAL BODILY INJURY.

SPEARS® MANUFACTURING COMPANY

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PVC SCHEDULE 40 FITTINGS

40-2-0199

Performance Engineered & Tested

SPEARS Schedule 40 PVC fitting designs combine years of proven experience with computer generated stress analysis to yield the optimum physical structure and performance for each fitting. Material reinforcement is uniformly placed in stress concentration areas for substantially improved pressure handling capability. Resulting products are subjected to numerous verification tests to assure the very best PVC fittings available.

Full 1/4" Through 12" Availability

Spears comprehensive line of PVC fittings offers a variety of injection molded configurations in Schedule 40 sizes 1/4" through 12" conforming to ASTM D 2466.

Exceptional Chemical & Corrosion Resistance

Unlike metal, PVC fittings never rust, scale, or pit, and will provide many years of maintenance-free service and extended system life.

High Temperature Ratings

PVC thermoplastic can handle fluids at service temperatures up to 140° F (60°C), allowing a wide range of process applications, including corrosive fluids.

Lower Installation Costs

Substantially lower material costs than steel alloys or lined steel, combined with lighter weight and ease of installation, can reduce installation costs by as much as 60% over conventional metal systems.

Higher Flow Capacity

Smooth interior walls result in lower pressure loss and higher volume than conventional metal fittings.

Additional Fabricated Configurations through 36"

Extra large, hard-to-find, and custom configurations are fabricated from NSF Certified pipe. Fittings are engineered and tested to provide full pressure handling capabilities according to Spears specifications.

PVC Valves

SPEARS PVC Valve products are available for total system compatibility and uniformity; see SPEARS' THERMOPLASTIC VALVES PRODUCT GUIDE & ENGINEERING SPECIFICATIONS (V-4).

Advanced Design Specialty Fittings

Spears wide range of innovative, improved products include numerous metal-to-plastic transition fittings and unions with Spears' patented stainless steel reinforced (SR) plastic threads.

MADE IN THE U.S.A. WITH PRIDE

LOSS PREVENTION CERTIFICATION BOARD LPCB NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Quality Systems Certificate No. 293
Corporate Facilities, Sylmar, CA
Assessed to ISO 9001

Sample Engineering Specifications

All PVC Schedule 40 fittings shall be produced by Spears Manufacturing Company from PVC Type I cell classification 12454, conforming to ASTM D 1784. All injection molded PVC Schedule 40 fittings shall be Certified for potable water service by NSF International and manufactured in strict compliance to ASTM D 2466. All fabricated fittings shall be produced in accordance with Spears General Specifications for Fabricated Fittings.

PROGRESSIVE PRODUCTS FROM SPEARS INNOVATION & TECHNOLOGY

Visit our web site: www.spearsmfg.com

PVC Thermoplastic Pipe Temperature Pressure De-Rating

System Operating Temperature °F (°C)	73 (23)	80 (27)	90 (32)	100 (38)	110 (43)	120 (49)	130 (54)	140 (60)
PVC	100%	90%	75%	62%	50%	40%	30%	22%

NOTE: Valves, Unions and Specialty Products have different elevated temperature ratings than pipe.

PVC Basic Physical Properties

Properties	ASTM Test Method	PVC
Mechanical Properties, 73°F		
Specific Gravity, g/cm^3	D 792	1.41
Tensile Strength, psi	D 638	7,000
Modulus of Elasticity, psi	D 638	440,000
Compressive Strength, psi	D 695	9,000
Flexural Strength, psi	D 790	13,200
Izod Impact, notched, ft-lb/in	D 256	.65
Thermal Properties		
Heat Deflection Temperature, °F at 66 psi	D 648	165
Thermal Conductivity, BTU/hr/sq ft/°F/in	C 177	1.2
Coefficient of Linear Expansion, in/in/°F	D 696	3.0 x 10^{-5}
Flammability		
Limiting Oxygen Index, %	D 2863	43
UL 94 Rating	94V-0	
Other Properties		
Water Absorption, % 24 hr.	D 570	.05
Industry Standard Color	White / Dark Gray	
ASTM Cell Classification	D 1784	12454
NSF Potable Water Approved	Yes	

PVC Chemical Resistance

PVC is generally inert to most mineral acids, bases, salts and paraffinic hydrocarbon solutions. For more information on PVC chemical resistance refer to the Chemical Resistance of Rigid Vinyls Based on Immersion Test, published by the GEON® company.

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Quick-Coupling Valves

Quick-Coupling Valve Cutaway

Quick-Coupling Valves

Primary Application

Industrial-strength brass quick-coupling valves for convenient water access.

Features

- *Red brass construction for long life and rugged performance.*
- *Yellow thermoplastic cover for durability. Optional locking cover on models 33DLRC, 44LRC, and 5LRC (use 2049 key to unlock). Metal cover on model 7 only.*
- *One-piece body design (models 3RC, 5RC, and 7).*
- *Two-piece body design for easy servicing (models 33DRC, 44LRC, and 44RC).*
- *Strong corrosion-resistant stainless steel spring prevents leakage.*

Operating Range

- *Pressure: 5 to 125 psi (0,35 to 8,63 bar)*
- *Flow: 10 to 125 gpm (2,27 to 28,38 m³/h; 0,63 to 7,88 l/s)*

Dimensions

- *3RC Height: 4¼" (10,8 cm)*
- *33DRC Height: 4⅜" (11,1 cm)*
- *33DLRC Height: 4⅝" (11,7 cm)*
- *44RC Height: 6" (15,2 cm)*
- *44LRC Height: 6" (15,2 cm)*
- *5RC Height: 5½" (14,0 cm)*
- *5LRC Height: 5½" (14,0 cm)*
- *7 Height: 5¾" (14,6 cm)*

Models

- *3RC: ¾" (20/27) Rubber Cover, 1-Piece Body*
- *33DRC: ¾" (20/27) Double Track Key Lug, Rubber Cover, 2-Piece Body*
- *33DLRC: ¾" (20/27) Double Track Key Lug, Locking Rubber Cover, 2-Piece Body*
- *44RC: 1" (26/34) Rubber Cover, 2-Piece Body*
- *44LRC: 1" (26/34) Locking Rubber Cover, 2-Piece Body*
- *5RC: 1" (26/34) Rubber Cover, 1-Piece Body*
- *5LRC: 1" (26/34) Locking Rubber Cover, 1-Piece Body*
- *7: 1½" (40/49) Metal Cover, 1-Piece Body*
- *5RC-BSP: 1" (26/34) Rubber Cover, 1-Piece Body, BSP threaded*
- *5LRC-BSP: 1" (26/34) Locking Rubber Cover, 1-Piece Body, BSP threaded*

Note: *For non-US applications, it is necessary to specify NPT or BSP thread type.*

3 RC

33 DRC

7

Quick-Coupling Valves

Non-Potable Quick-Coupling Valves

Primary Application

Industrial-strength brass quick-coupling valves for convenient water access in non-potable systems.

Features

- *Red brass construction for long life and rugged performance.*
- *Locking purple thermoplastic covers restrict tampering (use 2049 key to unlock).*
- *Two-piece body design for easy servicing.*
- *Strong corrosion-resistant stainless steel spring prevents leakage.*
- *Covers marked with **"Do Not Drink!"** warnings in English and Spanish.*

Operating Range

- *Pressure: 5 to 125 psi (0,35 to 8,63 bar)*
- *Flow: 10 to 70 gpm (2,27 to 15,89 m³/h; 0,63 to 4,41 l/s)*

Dimensions

- *33DNP Height: 4⅜" (11,1 cm)*
- *44NP Height: 6" (15,2 cm)*
- *5NP Height: 5½" (14,0 cm)*

Models

- *33DNP: ¾" (20/27)*
- *44NP: 1" (26/34)*
- *5NP: 1" (26/34*

Quick-Coupling Valves Pressure Loss

Pressure Loss (psi)

Flow gpm	3RC ¾"	33 DRC 33 DNP ¾"	4NP-ACME 1"	44 RC 44 NP 1"	5NP 1"	7 1½"
10	1.8	2.0	0.8	-	-	-
15	4.7	4.3	1.9	2.2	-	-
20	7.2	7.6	3.5	4.4	-	-
30	-	-	7.7	11.5	1.9	-
40	-	-	14.1	-	3.8	-
50	-	-	-	-	6.4	1.7
60	-	-	-	-	9.6	2.5
70	-	-	-	-	14.0	3.6
80	-	-	-	-	-	4.9
100	-	-	-	-	-	8.4
125	-	-	-	-	-	14.0

METRIC (bar)

Flow m³/h	Flow l/s	3RC ¾"	33 DRC 33 DNP ¾"	4NP-ACME 1"	44 RC 44 NP 1"	5NP 1"	7 1½"
3	0,83	0,25	0,23	0,10	-	-	-
4	1,11	0,42	0,41	0,19	0,22	-	-
5	1,39	-	-	0,28	0,37	-	-
6	1,67	-	-	0,41	0,57	-	-
7	1,94	-	-	0,57	0,84	0,14	-
8	2,22	-	-	0,75	-	0,19	-
9	2,50	-	-	0,95	-	0,25	-
10	2,78	-	-	1,19	-	0,33	-
12	3,33	-	-	-	-	0,50	0,13
14	3,89	-	-	-	-	0,72	0,18
16	4,44	-	-	-	-	0,97	0,25
22	6,11	-	-	-	-	-	0,72
28	7,78	-	-	-	-	-	0,97

Quick-Coupling Valves

Acme Thread Quick-Coupling Valves

Primary Application

Industrial-strength brass quick-coupling valves for controlled water access in non-potable systems. Requires special key to access water supply.

Features

- *Red brass construction for long life and rugged performance.*
- *Locking purple thermoplastic cover restricts tampering (use 2049 key to unlock).*
- *Strong corrosion-resistant stainless steel spring prevents leakage.*
- *Covers marked with **"Do Not Drink!"** warnings in English and Spanish.*
- *ACME thread locking mechanism prevents unauthorized access.*

Operating Range

- *Pressure: 40 to 150 psi (2,76 to 10,35 bar)*
- *Flow: 5 to 45 gpm (1,14 to 10,22 m³/h; 0,32 to 2,84 l/s)*

Dimensions

- *Height: 5" (12,7 cm)*

Models

- *4NP-ACME: 1" (26/34) NPT threaded inlet*
- *I-4NP-ACME: 1" (26/34) BSP threaded inlet*
- *4K-ACME: ACME locking mechanism with NPT top threads*
- *I-4K-ACME: ACME locking mechanism with BSP top threads*

33-DNP

4NP-ACME

Quick-Coupling Keys

Valve Keys

Primary Application

Key threads into top of quick-coupling valve to provide water access.

Models

- *33DK: ¾" (20/27)*
- *44K: 1" (26/34)*
- *55K-1: 1" (26/34)**
- *7K: 1½" (40/49)**
- *4K-ACME: 1" (26/34) NPT ACME*
- *I-4K-ACME: 1" (26/34) BSP ACME*

** Available with BSP threads; specify when ordering.*

Corresponding Valve Keys

Valve	Key	Top Pipe Threads Male	Female
3RC	33DK	¾"	½"
33DRC/33NP	33DK	¾"	½"
44RC/44NP	44K	1"	¾"
5RC	55K-1	1"	-
7	7K	1 ½"	1 ¼"
4NP-ACME	4K-ACME	1"	¾"
I-4NP-ACME	I-4NP-ACME	1"	¾"

METRIC

Valve	Key	Top Pipe Threads Male	Female
3RC	33DK	20/27	15/21
33DRC/33NP	33DK	20/27	15/21
44RC/44NP	44K	26/34	20/27
5RC	55K-1	26/34	-
7	7K	40/49	33/42
4NP-ACME	4K-ACME	26/34	20/27
I-4NP-ACME	I-4K-ACME	26/34	20/27

55K-1

Cover Keys

Locking Cover Key

Primary Application

Unlocks the thermoplastic cover on quick-coupling valves equipped with locking covers.

Features

- *Locks and unlocks the optional locking cover on quick-coupling valves.*
- *Operates the valve marker compression lock.*
- *Compatible with models 33DLRC, 33DNP, 44LRC, 44NP, and 5LRC.*

Model

- *2049 Cover Key*

2049

Hose Swivel

SH Series

Primary Application

Attaches water hose to quick-coupling valve key.

Features

- *Swivels up to 360°.*
- *Allows hose to be pulled in any direction.*
- *Prevents hose damage.*

Specifications

- *SH-0*
  ¾" (20/27) female pipe thread x ¾" (20/27) male hose thread
- *SH-1*
  1" (26/34) female pipe thread x ¾" (20/27) male hose thread
- *SH-2*
  1" (26/34) female pipe thread x 1" (26/34) male hose thread
- *SH-3*
  1½" (40/49) female pipe thread x 1" (26/34) male hose thread

Models

- *SH-0*
- *SH-1*
- *SH-2**
- *SH-3*

**Available with BSP threads.*

SH-0

Pressure Hose Gauge Assembly

PHG

Primary Application

Attaches to Schrader valve on PRS-D pressure regulator to visually read outlet pressure.

Features

- *Monitors valve outlet pressure.*
- *Quick connect hose fitting is simple to connect and disconnect to PRS-D Schrader valve.*

Specifications

- *0 to 160 psi (0 to 11,04 bar) gauge provides accurate reading of outlet pressure.*
- *36" (91,4 cm) long, high-pressure hose permits easy reading of gauge.*

Model

- *PHG*

PHG

Valve Accessories

Non-Potable Valve Handle Assembly

Primary Application

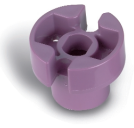
Purple flow control handle identifies valve as part of a non-potable system.

Features

- *Easily field installed.*
- *Sizes for all Rain Bird commercial valves.*

Models

- *PGA-NP-HAN1*
  (1" and 1½" PGA Valves)
- *PGA-NP-HAN2*
  (2" PGA Valves)
- *PEB-NP-HAN1*
  (1" PEB/PESB Valves)
- *PEB-NP-HAN2*
  (1½" and 2" PEB/PESB Valves)
- *EFB-GB-NP-HAN*
  (all EFB-CP and GB Valves)
- *BPE-NP-HAN*
  (3" BPE/BPES Valves)



BPE-NP-HAN

PEB-NP-HAN PGA-NP-HAN EFB-GB-NP-HAN

TECH SPECS

1800 Series Spray Heads

Industry's Leading Spray Heads

1800 Series Spray Heads have first-rate quality built in for reliable operation and long life. Their superior components and features make them the spray heads of choice for a wide variety of applications.

Features

- Exclusive co-molded, pressure-activated, multi-functional wiper seal assures positive seal without excess "flow-by" which enables more heads to be installed on the same valve.
- Precision controlled flush at pop-down clears debris from unit, assuring positive stem retraction in all soil types.
- Strong stainless steel spring provides reliable stem retraction.
- Ratchet mechanism on all models allows easy nozzle pattern alignment without tools.
- Pre-installed 1800 Pop-Top™ flush plug blocks debris from entering after flushing. Allows for easy nozzle installation.
- Constructed of time-proven UV-resistant plastic and corrosion resistant stainless steel parts, assuring long product life.
- All sprinkler components are removable from the top without special tools, providing for quick and easy flushing and maintenance of the sprinkler.
- Side and bottom inlets featured on 1806 and 1812 models.
- Five-year trade warranty.

Operating Range

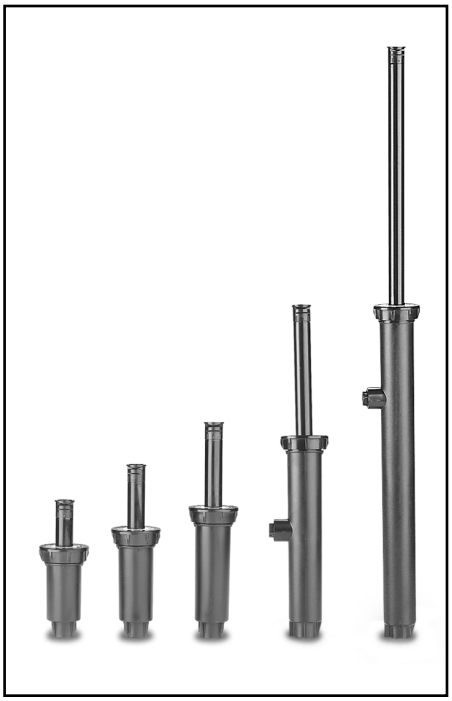
- Spacing: 3 to 20 feet (0,9 to 6,1 m)
- Pressure: 15 to 70 psi (1,0 to 4,8 Bars)

Specifications

- Flow-by: 0 at 8 psi (0,6 Bars) or greater; 0.50 GPM (0,11 m^3/h; 0,03 l/s) otherwise

Dimensions/Models

- ½" (15/21) NPT female threaded inlet
- Models and height:
  1802: 4" (10 cm) body height;
  2" pop-up height (5 cm)
  1803: 4⅞" (12 cm) body height;
  3" pop-up height (7,6 cm)
  1804: 6" (15 cm) body height;
  4" pop-up height (10 cm)
  1806: 9⅜" (24 cm) body height;
  6" pop-up height (15 cm)
  1812: 16" (40 cm) body height;
  12" pop-up height (30 cm)
- Exposed surface diameter: 2¼" (5,7 cm)



How to Specify

1804-SAM-PRS

Model	***Optional Feature***	***Optional Feature***
1804	*SAM: Seal-A-Matic™ check valve*	*PRS: In-stem pressure regulator*

1800 SAM Series

Ideal for use in areas with changing elevations, the 1800 SAM Series offers all 1800 Series features plus:

- Built-in Seal-A-Matic™ (SAM) check valve. Eliminates the need for under-the-head check valves. No parts to be installed at the site.
- Traps water in lateral pipes in elevation changes of up to 8' (2,4 m). Reduces wear on system components by minimizing water hammer during start-up.
- Prevents drainage from spray heads at lower elevations. Stops water waste. Ends landscape damage due to flooding and/or erosion.
- Even stronger retract spring to accommodate elevation changes up to 8' (2,4 m). One of the strongest springs in the industry.
- Designed for use with all Rain Bird plastic and brass spray head nozzles.
- "SAM" stamped on cap for easy identification and maintenance.
- Five-year trade warranty.

Operating Range

- Spacing: 3 to 20 feet (0,9 to 6,1 m)
- Pressure: 25 to 70 psi (1,7 to 4,8 Bars)

Specifications

- SAM capability: holds up to 8 feet (2,4 m) of head; 3.5 psi (0,2 Bars)
- Flow-by: 0 at 8 psi (0,6 Bars) or greater; 0.50 GPM (0,11 m^3/h; 0,03 l/s) otherwise
- SAM operable only when installed by bottom inlet

Dimensions

- ½" (15/21) NPT female threaded inlets
- Body height: 1804 SAM - 6" (15 cm), 1806 SAM - 9⅜" (24 cm), 1812 SAM-16" (40 cm)
- Exposed surface diameter: 2¼" (5,7 cm)

Models

- 1804 SAM: 4" pop-up height (10 cm)
- 1806 SAM: 6" pop-up height (15 cm)
- 1812 SAM: 12" pop-up height (30 cm)

1800 PRS Series

Designed for areas with high and/or widely fluctuating water pressures, the 1800 PRS Series has all 1800 Series features plus:

- **PATENTED** PRS pressure regulator built into the stem. No parts to be installed at the site. Saves time and money.
- Maintains constant outlet pressure at 30 psi (2,1 Bars). Spray heads and nozzles perform best at 30 psi. Ensures maximum spray head and nozzle performance, even with varying inlet pressures. Maintains constant pressure regardless of nozzle used.
- Restricts water loss by up to 70% if nozzle is removed or damaged. Saves water and money. Reduces possibility of accidents and property damage. Recommended for vandal-prone areas.
- Ends misting and fogging caused by high pressure. Stops water waste. Ensures necessary watering occurs in high pressure or wind conditions.
- Designed for use with all Rain Bird plastic and brass spray head nozzles.
- "PRS" stamped on cap for easy identification and maintenance.
- Five-year trade warranty.

Operating Range

- Spacing: 3 to 20 feet (0,9 to 6,1 m)
- Pressure: 15 to 70 psi (1 to 5 Bars)

Specifications

- Regulates nozzle pressure to an average 30 psi (2,1 Bars) with inlet pressures of up to 70 psi (4,8 Bars).
- Flow-by: 0 at 8 psi (0,6 Bars) or greater; 0.50 GPM (0,11 m^3/h; 0,03 l/s) otherwise
- Installation: side or bottom inlet
- Side inlet installation not recommended in freezing climates

Dimensions

- ½" (15/21) NPT female threaded inlets
- Body height: 1804 PRS - 6" (15 cm), 1806 PRS - 9⅜" (24 cm), 1812 PRS - 16" (40 cm)
- Exposed surface diameter: 2¼" (5,7 cm)

Models

- 1804 PRS: 4" pop-up height (10 cm)
- 1806 PRS: 6" pop-up height (15 cm)
- 1812 PRS: 12" pop-up height (30 cm)

1800 SAM-PRS Series

Meets the needs of all spray areas, regardless of changing elevation or water pressures. Incorporates all 1800 Series SAM and PRS features. "SAM-PRS" stamped on the cap for easy identification and maintenance.

Operating Range

- Spacing: 3 to 20 feet (0,9 to 6,1 m)
- Pressure: 25 to 70 psi (1,7 to 4,8 Bars)

Specifications

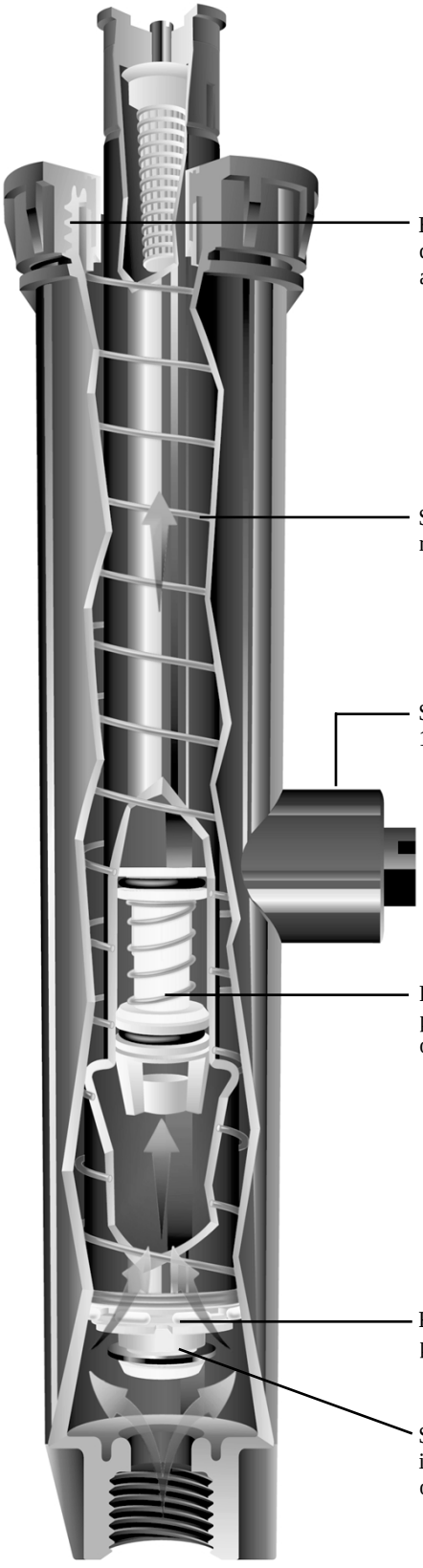
- SAM capability: holds up to 8 feet (2,4 m) of head; 3.5 psi (0,2 Bars)
- Flow-by: 0 at 8 psi (0,6 Bars) or greater; 0.50 GPM (0,11 m^3/h; 0,03 l/s) otherwise
- SAM operable only when installed by bottom inlet

Dimensions

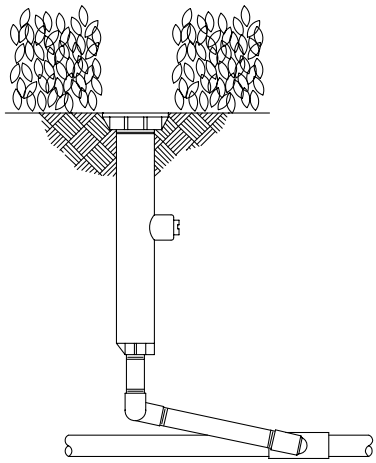
- ½" (15/21) NPT female threaded inlets
- Body height: 1804 SAM-PRS - 6" (15 cm), 1806 SAM-PRS - 9⅜" (24 cm), 1812 SAM-PRS - 16" (40 cm)
- Exposed diameter: 2¼" (5,7 cm)

Models

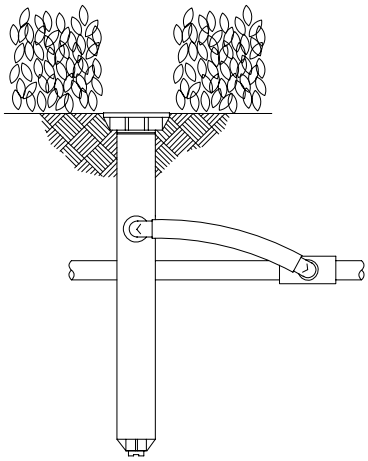
- 1804 SAM-PRS: 4" pop-up height (10 cm)
- 1806 SAM-PRS: 6" pop-up height (15 cm)
- 1812 SAM-PRS: 12" pop-up height (30 cm)



1806 with Swing Joint on Bottom Inlet



1812 with Swing Pipe on Side Inlet



Specifications

1802, 1803, 1804, 1806 and 1812 Pop-up Full or Part Circle Spray Sprinkler

The full or part circle pop-up sprinkler shall be capable of covering _____ feet radius (m) at _____ pounds per square inch (Bars) with a discharge rate of _____ gallons per minute (m^3/h; l/s). The overall pop-up height shall be _____ inches (cm).

The sprinkler body, stem, nozzle and screen shall be constructed of heavy-duty, ultra-violet resistant plastic. It shall have a heavy-duty stainless steel retract spring for positive pop-down and a ratcheting system for easy alignment of the pattern. The sprinkler shall have a soft elastomer pressure-activated co-molded wiper seal for cleaning debris from the pop-up stem as it retracts into the case to prevent the sprinkler from sticking up to minimize "flow-by."

The sprinkler shall have a matched precipitation rate (MPR) plastic or brass nozzle with an adjusting screw capable of regulating the radius and flow. The sprinkler shall be capable of housing under the nozzle protective, non-clogging filter screens or pressure compensating screens (PCS). The screen shall be used in conjunction with the adjusting screw for regulating. The 6" (15 cm) and 12" (30 cm) models shall have both a side and a bottom ½" (15/21) (FNPT) inlet for ease of installation.

The sprinkler shall have a Pop-Top™ Flush Plug pre-installed. The plug shall prevent debris from clogging the sprinkler during installation and allow for the system to be flushed before nozzling. The plug shall be bright orange in color and constructed of polypropylene material.

1804 SAM, 1806 SAM and 1812 SAM Full or Part Circle Seal-A-Matic™ Pop-up Spray Sprinkler

Optional Feature Specifications:

When so indicated on the design, the 4", 6" or 12" high pop-up spray sprinklers shall also include a Seal-A-Matic (SAM) check valve to prevent low-head drainage of up to 8 feet of head. This feature shall require the use of the bottom inlet only. These units shall be identifiable from the top with "SAM" marking on the cap. The sealing device shall be an integral part of the pop-up stem, removable through the top of the sprinkler, and shall seal against the bottom case inlet. It shall create no more than 1 psi pressure drop at the maximum rated flow.

1804 PRS, 1806 PRS and 1812 PRS Full or Part Circle Pressure Regulating Pop-up Spray Sprinkler

Optional Feature Specifications:

When so indicated on the design, the 4", 6" or 12" high pop-up spray sprinkler shall also include a pressure regulating (PRS) device to prevent high pressure fogging to the nozzle stream. This regulating device shall be an integral part of the pop-up stem, removable through the top of the case. These units shall be identifiable from the top with "PRS" markings on the cap.

The device shall regulate the nozzle pressure to 30 psi for inlet pressures from 35 to 70 psi. Below 35 psi the pressure loss shall not exceed 6 psi.

1804 SAM-PRS, 1806 SAM-PRS and 1812 SAM-PRS Seal-A-Matic Pressure Regulating Pop-up Spray Sprinkler

Optional Feature Specifications:

When so indicated on the design, the 4", 6" or 12" high pop-up spray sprinkler shall also include a Seal-A-Matic (SAM) check valve and a pressure regulating (PRS) device. These units shall be identifiable from the top with "SAM-PRS" markings on the cap.

The check valve shall prevent low-head drainage of up to 8 feet of head. The pressure regulating device shall prevent high pressure fogging of the nozzle stream by regulating the nozzle pressure to 30 psi for inlet pressures from 35 to 70 psi. Below 35 psi the pressure loss shall not exceed 6 psi. These models shall utilize the bottom inlet only.

The sprinkler shall be as manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California.

Rain Bird Sales, Inc.
970 West Sierra Madre Avenue, Azusa, CA 91702
Phone: (626) 963-9311 Fax: (626) 812-3411

Rain Bird Sales, Inc.
6640 South Bonney Ave., Tucson, AZ 85706
Phone: (520) 434-6200 Fax: (520) 434-6246

Rain Bird International, Inc.
145 North Grand Avenue, Glendora, CA 91741
Phone: (626) 963-9311 Fax: (626) 963-4287

Rain Bird Technical Service
(800) 247-3782 (U.S. only)

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RAIN BIRD®

TECH SPECS

Matched Precipitation Rate (MPR) Nozzles

Primary Application

Matched Precipitation Rate (MPR) nozzles simplify the design process by allowing sprinklers with various arcs and radii to be mixed on the same circuit. Fit all Rain Bird spray heads and shrub adapters.

Features

- Matched precipitation rates across sets and across patterns in new 5 Series, 8 Series, 10 Series, 12 Series, and 15 Series for even water distribution and design flexibility.
- New 5 Series nozzles meet small-area shrub or turf requirements.
- New and improved 8 Series nozzles now have a lower water flow which allows more spray heads per zone.
- 1800 Series white filter (.035" x .045") screens (shipped with nozzles) maintain precise radius adjustment and prevent clogging. (New and improved 5 and 8 Series nozzles are shipped with blue fine-mesh (.02" x .02") filter screens.)
- Stainless steel adjustment screw to adjust flow and radius.

Operating Range

- Spacing: 5 to 15 feet (1,5 to 4,5 m)
- Pressure: 15 to 30 psi (1 to 2,1 Bars)
- Optimum pressure: 30 psi (2,1 Bars)

Specifications

5, 8, 10, 12 and 15 Series MPR Nozzles

The nozzles shall have precipitation rates matched across sets and across patterns. The nozzle shall be capable of covering a ___ feet radius (FT. RAD)/(meter) at ___ pounds per square inch (psi)/(bars) with a discharge rate of ___ gallons per minute (GPM)/(m3/h,l/s).

The plastic MPR nozzle shall be constructed of UV resistant plastic. The radius adjustment screw shall be constructed of stainless steel.

The nozzle shall accept the non-clogging 1800 Series filter screens to allow for radius adjustment and the MPR Plastic Nozzles shall also accept the pressure compensating screens (PCS Series).

The Plastic MPR nozzles shall be manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California.

Models

- 5 Series **New**
- 5 Series: bubbler nozzles
- 8 Series **Improved**
- 10 Series
- 12 Series
- 15 Series
- 15 Strip Series
- 16 Series: stream spray
- 22 Series: standard stream spray

5 Series MPR - New!

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
	5° Trajectory				
5F	15	2	0.09	2.07	2.39
	20	3	0.19	2.01	2.32
	25	4	0.27	1.62	1.87
	30	5	0.41	1.58	1.83
5H	15	2	0.04	2.07	2.39
	20	3	0.09	2.01	2.32
	25	4	0.13	1.62	1.87
	30	5	0.20	1.58	1.83
5T	15	2	0.03	2.07	2.39
	20	3	0.06	2.01	2.32
	25	4	0.09	1.62	1.87
	30	5	0.13	1.58	1.83
5Q	15	2	0.02	2.07	2.39
	20	3	0.05	2.01	2.32
	25	4	0.07	1.62	1.87
	30	5	0.10	1.58	1.83

METRIC

Nozzle	Pressure Bars	Radius m	Flow m³/h	Precip. mm/h ■	Precip. mm/h ▲
	5° Trajectory				
5F	1,0	0,6	0,02	52	60
	1,5	1,0	0,05	47	55
	2,0	1,4	0,08	41	48
	2,1	1,5	0,09	40	46
5H	1,0	0,6	0,01	52	60
	1,5	1,0	0,02	47	55
	2,0	1,4	0,04	41	48
	2,1	1,5	0,05	40	46
5T	1,0	0,6	0,01	52	60
	1,5	1,0	0,02	47	55
	2,0	1,4	0,03	41	48
	2,1	1,5	0,03	40	46
5Q	1,0	0,6	0,01	52	60
	1,5	1,0	0,01	47	55
	2,0	1,4	0,02	41	48
	2,1	1,5	0,02	40	46

How to Specify/Order:

1804-SAM-15H-PCS-060

- **Model**
- **Optional Feature**
- **Nozzle Series Pattern**
- **Optional Performance Screen**

This specifies an 1800 Series sprayhead with 4" (10 cm) pop-up height; Seal-A-Matic™ check valve; 15 Series nozzle providing 180° coverage and pressure compensating screen to reduce radius to 5' (1,5 m) at 30 psi (2,1 bars) and bring flow down to .6 GPM (0,14m³/h, 0,04 l/s).

■ *Square spacing based on 50% diameter of throw.*

▲ *Triangular spacing based on 50% diameter of throw.*

NOTE: Specify sprinkler body and nozzles separately. Refer to Price List for shipping quantities.

NOTE: Radius reduction over 25% of the normal throw of the nozzle is not recommended.

8 Series MPR - New and Improved!

10° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
8F	15	5	0.54	2.07	2.39
	20	6	0.75	2.01	2.32
	25	7	0.82	1.62	1.87
	30	8	1.05	1.58	1.83
8H	15	5	0.27	2.07	2.39
	20	6	0.38	2.01	2.32
	25	7	0.41	1.62	1.87
	30	8	0.52	1.58	1.83
8T	15	5	0.18	2.07	2.39
	20	6	0.25	2.01	2.32
	25	7	0.27	1.62	1.87
	30	8	0.35	1.58	1.83
8Q	15	5	0.13	2.07	2.39
	20	6	0.19	2.01	2.32
	25	7	0.21	1.62	1.87
	30	8	0.26	1.58	1.83

METRIC

10° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
8F	1,0	1,5	0,12	0,03	52	60
	1,5	1,9	0,16	0,05	47	55
	2,0	2,3	0,22	0,06	41	48
	2,1	2,4	0,23	0,06	40	46
8H	1,0	1,5	0,06	0,02	52	60
	1,5	1,9	0,09	0,02	47	55
	2,0	2,3	0,11	0,03	41	48
	2,1	2,4	0,12	0,03	40	46
8T	1,0	1,5	0,04	0,01	52	60
	1,5	1,9	0,06	0,02	47	55
	2,0	2,3	0,07	0,02	41	48
	2,1	2,4	0,08	0,02	40	46
8Q	1,0	1,5	0,03	0,01	52	60
	1,5	1,9	0,04	0,01	47	55
	2,0	2,3	0,05	0,02	41	48
	2,1	2,4	0,06	0,02	40	46

10 Series MPR

15° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
10F	15	7	1.16	2.28	2.63
	20	8	1.30	1.96	2.26
	25	9	1.44	1.71	1.98
	30	10	1.58	1.52	1.75
10H	15	7	0.58	2.28	2.63
	20	8	0.65	1.96	2.26
	25	9	0.72	1.71	1.98
	30	10	0.79	1.52	1.75
10T	15	7	0.39	2.28	2.63
	20	8	0.43	1.96	2.26
	25	9	0.48	1.71	1.98
	30	10	0.53	1.52	1.75
10Q	15	7	0.29	2.28	2.63
	20	8	0.33	1.96	2.26
	25	9	0.36	1.71	1.98
	30	10	0.39	1.52	1.75

METRIC

15° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
10F	1,0	2,1	0,26	0,07	58	67
	1,5	2,4	0,29	0,08	50	58
	2,0	3,0	0,35	0,10	39	45
	2,1	3,1	0,36	0,10	37	43
10H	1,0	2,1	0,13	0,04	58	67
	1,5	2,4	0,14	0,04	50	58
	2,0	3,0	0,18	0,05	39	45
	2,1	3,1	0,18	0,05	37	43
10T	1,0	2,1	0,09	0,03	58	67
	1,5	2,4	0,10	0,03	50	58
	2,0	3,0	0,12	0,03	39	45
	2,1	3,1	0,12	0,03	37	43
10Q	1,0	2,1	0,06	0,02	58	67
	1,5	2,4	0,07	0,02	50	58
	2,0	3,0	0,09	0,03	39	45
	2,1	3,1	0,09	0,03	37	43

12 Series MPR

30° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
12F	15	9	1.80	2.14	2.47
	20	10	2.10	2.02	2.34
	25	11	2.40	1.91	2.21
	30	12	2.60	1.74	2.01
12TQ	15	9	1.35	2.14	2.47
	20	10	1.58	2.02	2.34
	25	11	1.80	1.91	2.21
	30	12	1.95	1.74	2.01
12TT	15	9	1.20	2.14	2.47
	20	10	1.40	2.02	2.34
	25	11	1.60	1.91	2.71
	30	12	1.74	1.74	2.01
12H	15	9	0.90	2.14	2.47
	20	10	1.05	2.02	2.34
	25	11	1.20	1.91	2.21
	30	12	1.30	1.74	2.01
12T	15	9	0.60	2.14	2.47
	20	10	0.70	2.02	2.34
	25	11	0.80	1.91	2.21
	30	12	0.87	1.74	2.01
12Q	15	9	0.45	2.14	2.47
	20	10	0.53	2.02	2.34
	25	11	0.60	1.91	2.21
	30	12	0.65	1.74	2.01

METRIC

30° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
12F	1,0	2,7	0,40	0,11	55	63
	1,5	3,2	0,48	0,14	47	54
	2,0	3,6	0,59	0,16	46	53
	2,1	3,7	0,60	0,16	44	51
12TQ	1,0	2,7	0,30	0,09	55	63
	1,5	3,2	0,36	0,10	47	54
	2,0	3,6	0,45	0,12	46	53
	2,1	3,7	0,45	0,12	44	51
12TT	1,0	2,7	0,26	0,08	55	63
	1,5	3,2	0,32	0,09	47	54
	2,0	3,6	0,40	0,11	46	53
	2,1	3,7	0,40	0,11	44	51
12H	1,0	2,7	0,20	0,06	55	63
	1,5	3,2	0,24	0,07	47	54
	2,0	3,6	0,30	0,08	46	53
	2,1	3,7	0,30	0,08	44	51
12T	1,0	2,7	0,13	0,04	55	63
	1,5	3,2	0,16	0,05	47	54
	2,0	3,6	0,20	0,05	46	53
	2,1	3,7	0,20	0,05	44	51
12Q	1,0	2,7	0,10	0,03	55	63
	1,5	3,2	0,12	0,03	47	54
	2,0	3,6	0,15	0,04	46	53
	2,1	3,7	0,15	0,04	44	51

15 Series MPR

30° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
15F	15	11	2.60	2.07	2.39
	20	12	3.00	2.01	2.32
	25	14	3.30	1.62	1.87
	30	15	3.70	1.58	1.83
15TQ	15	11	1.95	2.07	2.39
	20	12	2.25	2.01	2.32
	25	14	2.48	1.62	1.87
	30	15	2.78	1.58	1.83
15TT	15	11	1.74	2.07	2.39
	20	12	2.01	2.01	2.32
	25	14	2.21	1.62	1.87
	30	15	2.48	1.58	1.83
15H	15	11	1.30	2.07	2.39
	20	12	1.50	2.01	2.32
	25	14	1.65	1.62	1.87
	30	15	1.85	1.58	1.83
15T	15	11	0.87	2.07	2.39
	20	12	1.00	2.01	2.32
	25	14	1.10	1.62	1.87
	30	15	1.23	1.58	1.83
15Q	15	11	0.65	2.07	2.39
	20	12	0.75	2.01	2.32
	25	14	0.82	1.62	1.87
	30	15	0.92	1.58	1.83

METRIC

30° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
15F	1,0	3,4	0,60	0,16	52	60
	1,5	3,9	0,72	0,19	47	55
	2,0	4,5	0,84	0,23	41	48
	2,1	4,6	0,84	0,23	40	46
15TQ	1,0	3,4	0,45	0,12	52	60
	1,5	3,9	0,54	0,15	47	55
	2,0	4,5	0,63	0,17	41	48
	2,1	4,6	0,63	0,18	40	46
15TT	1,0	3,4	0,40	0,11	52	60
	1,5	3,9	0,48	0,13	47	55
	2,0	4,5	0,55	0,15	41	48
	2,1	4,6	0,56	0,16	40	46
15H	1,0	3,4	0,30	0,08	52	60
	1,5	3,9	0,36	0,10	47	55
	2,0	4,5	0,42	0,11	41	48
	2,1	4,6	0,42	0,12	40	46
15T	1,0	3,4	0,20	0,05	52	60
	1,5	3,9	0,24	0,07	47	55
	2,0	4,5	0,28	0,08	41	48
	2,1	4,6	0,28	0,08	40	46
15Q	1,0	3,4	0,15	0,04	52	60
	1,5	3,9	0,18	0,05	47	55
	2,0	4,5	0,21	0,06	41	48
	2,1	4,6	0,21	0,06	40	46

Note: All MPR nozzles tested on 4" pop-ups.
Performance data taken in zero wind conditions.
Note: Radius reduction over 25% of the normal throw of the nozzle is not recommended.

■ *Square spacing based on 50% diameter of throw.*
▲ *Triangular spacing based on 50% diameter of throw.*

15 Strip Series

30° Trajectory

Nozzle	Pressure psi	W x L ft.	Flow GPM
15SQ	15	18 x 18	2.68
	20	19 x 19	3.06
	25	21 x 21	3.42
	30	23 x 23	3.73
15EST	15	4 x 13	0.45
	20	4 x 14	0.50
	25	4 x 14	0.56
	30	4 x 15	0.61
15CST	15	4 x 25	0.89
	20	4 x 28	1.00
	25	4 x 28	1.11
	30	4 x 30	1.21
15SST	15	4 x 26	0.89
	20	4 x 28	1.00
	25	4 x 28	1.11
	30	4 x 30	1.21
9SST	15	9 x 15	1.34
	20	9 x 16	1.47
	25	9 x 18	1.60
	30	9 x 18	1.73

METRIC

30° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s
15SQ	1,0	5,5 x 5,5	0,61	0,17
	1,5	5,8 x 5,8	0,69	0,19
	2,0	6,4 x 6,4	0,78	0,22
	2,1	7,0 x 7,0	0,85	0,23
15EST	1,0	1,2 x 4,0	0,10	0,03
	1,5	1,2 x 4,3	0,11	0,03
	2,0	1,2 x 4,3	0,13	0,04
	2,1	1,2 x 4,6	0,14	0,04
15CST	1,0	1,2 x 7,9	0,20	0,06
	1,5	1,2 x 8,5	0,23	0,06
	2,0	1,2 x 8,5	0,25	0,07
	2,1	1,2 x 9,2	0,27	0,08
15SST	1,0	1,2 x 7,9	0,20	0,06
	1,5	1,2 x 8,5	0,23	0,06
	2,0	1,2 x 8,5	0,25	0,07
	2,1	1,2 x 9,2	0,27	0,08
9SST	1,0	2,7 x 4,6	0,30	0,08
	1,5	2,7 x 4,9	0,33	0,09
	2,0	2,7 x 5,5	0,36	0,10
	2,1	2,7 x 5,5	0,39	0,11

16 Series MPR

15° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM
16F-SLA	15	13	2.37
	20	14	2.66
	25	15	2.96
	30	16	3.22
16H-SLA	15	13	1.18
	20	14	1.33
	25	15	1.48
	30	16	1.61
16Q-SLA	15	13	0.59
	20	14	0.67
	25	15	0.74
	30	20	0.81

METRIC

15° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s
16F-SLA	1,0	4,0	0,54	0,15
	1,5	4,3	0,60	0,17
	2,0	4,6	0,67	0,19
	2,1	4,9	0,73	0,20
16H-SLA	1,0	4,0	0,27	0,07
	1,5	4,3	0,30	0,08
	2,0	4,6	0,34	0,09
	2,1	4,9	0,37	0,10
16Q-SLA	1,0	4,0	0,13	0,04
	1,5	4,3	0,15	0,04
	2,0	4,6	0,17	0,05
	2,1	4,9	0,18	0,05

22 Series MPR

35° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM
22F-SS	15	17	2.37
	20	18	2.66
	25	19	2.96
	30	20	3.22
22H-SS	15	17	1.18
	20	18	1.33
	25	19	1.48
	30	20	1.61
22Q-SS	15	17	0.59
	20	18	0.67
	25	19	0.74
	30	20	0.81

METRIC

35° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s
22F-SS	1,0	5,2	0,54	0,15
	1,5	5,5	0,60	0,17
	2,0	5,8	0,67	0,19
	2,1	6,1	0,73	0,20
22H-SS	1,0	5,2	0,27	0,07
	1,5	5,5	0,30	0,08
	2,0	5,8	0,34	0,09
	2,1	6,1	0,37	0,10
22Q-SS	1,0	5,2	0,13	0,04
	1,5	5,5	0,15	0,04
	2,0	5,8	0,17	0,05
	2,1	6,1	0,18	0,05

Note: 16 Series and 22 Series recommended for ground cover or shrub areas only.

5 Series MPR Stream Bubbler Nozzles

0° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM
5F-B	15	5	1.50
	20	5	1.50
	25	5	1.50
	30	5	1.50
5H-B	15	5	1.00
	20	5	1.00
	25	5	1.00
	30	5	1.00
5Q-B	15	5	0.50
	20	5	0.50
	25	5	0.50
	30	5	0.50
5CST-B	15	5	0.50
	20	5	0.50
	25	5	0.50
	30	5	0.50

METRIC

0° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s
5F-B	1,0	1,5	0,35	0,09
	1,5	1,5	0,35	0,09
	2,0	1,5	0,35	0,09
	2,1	1,5	0,35	0,09
5H-B	1,0	1,5	0,23	0,06
	1,5	1,5	0,23	0,06
	2,0	1,5	0,23	0,06
	2,1	1,5	0,23	0,06
5Q-B	1,0	1,5	0,12	0,03
	1,5	1,5	0,12	0,03
	2,0	1,5	0,12	0,03
	2,1	1,5	0,12	0,03
5CST-B	1,0	1,5	0,12	0,03
	1,5	1,5	0,12	0,03
	2,0	1,5	0,12	0,03
	2,1	1,5	0,12	0,03

Note: Indicates adjusted radius @ psi shown.
Note GPM @ adjusted radius of 5'.

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D39026E

RAIN BIRD®

TECH SPECS

Variable Arc Nozzles (VANs)

Primary Application

Adjustable nozzles for all standard and irregular-shaped turf and shrub areas. Fit all Rain Bird spray heads and shrub adapters.

Features

- Easy arc adjustment from 0° to 360° for 10-, 12-, 15- and 18 VAN; 0° to 330° for 4-, 6- and 8-VAN.
- Simple twist of center collar increases or decreases arc setting.
- No special tools required.
- Stainless steel adjustment screw to adjust flow and radius.
- Ideal for watering odd-shaped areas.
- 12-, 15-, and 18 VAN have matched precipitation rates with Rain Bird MPR Nozzles.
- Shipped with blue filter screen (.02 x .02) to maintain precise radius adjustment and prevent clogging.

Models

- 4-VAN
- 6-VAN
- 8-VAN
- 10-VAN
- 12-VAN
- 15-VAN
- 18-VAN **NEW!**

Operating Range

- Radius: *

4-VAN: 3 to 4 feet (0,9 to 1,2 m)
6-VAN: 4 to 6 feet (1,2 to 1,8 m)
8-VAN: 6 to 8 feet (1,8 to 2,4 m)
10-VAN: 8 to 10 feet (2,4 to 3,0 m)
12-VAN: 10 to 12 feet (3,0 to 3,7 m)
15-VAN: 12 to 15 feet (3,7 to 4,6 m)
18-VAN: 14 to 18 feet (4,3 to 5,5 m)

- Pressure: 15 to 30 psi (1 to 2,1 Bars)
- Optimum pressure: 30 psi (2,1 Bars)

*These ranges are based on proper pressure at nozzle.

Specifications

4, 6, 8, 10, 12, 15 and 18 Series VAN Nozzles

The nozzle shall be capable of covering a _____ feet radius (FT. RAD)/meter) at _____ pounds per square inch (psi)/(bars) with a discharge rate of _____ gallons per minute (GPM)/(m3/h,l/s).

The plastic VAN nozzle shall be constructed of UV resistant plastic. The radius adjustment screw shall be constructed of stainless steel.

The nozzle shall accept the Rain Bird blue filter screen to allow for radius adjustment.

The plastic VAN nozzles shall be manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California.

Simply twist collar to adjust arc pattern

How to Specify/Order:

1804-15-VAN

- **1804** — Spray Head Model
- **15-VAN** — Nozzle Series Pattern

This specifies an 1800 Series spray head with 4" (10 cm) pop-up height; 15 Series Variable Arc Nozzle providing 0° - 360° coverage.

4 Series VAN

0° Trajectory ■ ▲

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
330° Arc	15	3	0.62	7.23	8.35
	20	3	0.70	8.17	9.43
	25	4	0.80	5.25	6.06
	30	4	0.88	5.78	6.67
270° Arc	15	3	0.52	7.42	8.57
	20	3	0.58	8.27	9.55
	25	4	0.66	5.29	6.11
	30	4	0.73	5.86	6.77
180° Arc	15	3	0.32	6.84	7.90
	20	3	0.37	7.91	9.13
	25	4	0.41	4.93	5.69
	30	4	0.45	5.41	6.25
90° Arc	15	3	0.21	8.98	10.37
	20	3	0.24	10.27	11.86
	25	4	0.26	6.26	7.23
	30	4	0.29	6.98	8.06

METRIC

0° Trajectory ■ ▲

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
330° Arc	1,0	0,9	0,14	0,04	189	218
	1,5	1,0	0,17	0,05	183	215
	2,0	1,2	0,20	0,06	152	176
	2,1	1,2	0,20	0,06	152	176
270° Arc	1,0	0,9	0,12	0,03	198	229
	1,5	1,0	0,14	0,04	187	216
	2,0	1,2	0,16	0,04	148	171
	2,1	1,2	0,17	0,05	157	181
180° Arc	1,0	0,9	0,07	0,02	173	200
	1,5	1,0	0,09	0,03	180	208
	2,0	1,2	0,10	0,03	139	161
	2,1	1,2	0,10	0,03	139	161
90° Arc	1,0	0,9	0,05	0,01	247	285
	1,5	1,0	0,06	0,02	240	277
	2,0	1,2	0,06	0,02	167	193
	2,1	1,2	0,07	0,02	194	224

■ *Square spacing based on 50% diameter of throw.*
▲ *Triangular spacing based on 50% diameter of throw.*

NOTE: Turning the radius reduction screw may be required to achieve catalog radius and flow when the arc is set at less than maximum arc.

6 Series VAN

0° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
330° Arc	15	4	0.85	5.58	6.44
	20	5	0.96	4.03	4.65
	25	5	1.09	4.58	5.29
	30	6	1.20	3.50	4.04
270° Arc	15	4	0.79	6.34	7.32
	20	5	0.88	4.52	5.22
	25	5	1.00	5.13	5.92
	30	6	1.10	3.92	4.53
180° Arc	15	4	0.42	5.05	5.83
	20	5	0.49	3.77	4.35
	25	5	0.55	4.24	4.90
	30	6	0.60	3.21	3.71
90° Arc	15	4	0.26	6.26	7.23
	20	5	0.30	4.62	5.33
	25	5	0.34	5.24	6.05
	30	6	0.37	3.96	4.57

METRIC

0° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
330° Arc	1,0	1,2	0,19	0,05	144	166
	1,5	1,5	0,23	0,06	112	129
	2,0	1,8	0,27	0,08	91	105
	2,1	1,8	0,27	0,08	91	105
270° Arc	1,0	1,2	0,18	0,05	167	193
	1,5	1,5	0,21	0,06	124	143
	2,0	1,8	0,24	0,07	99	114
	2,1	1,8	0,25	0,07	103	119
180° Arc	1,0	1,2	0,10	0,03	139	161
	1,5	1,5	0,11	0,03	98	113
	2,0	1,8	0,13	0,04	80	92
	2,1	1,8	0,14	0,04	86	99
90° Arc	1,0	1,2	0,06	0,025	167	193
	1,5	1,5	0,07	0,02	124	143
	2,0	1,8	0,08	0,02	99	114
	2,1	1,8	0,08	0,02	99	114

8 Series VAN

5° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
330° Arc	15	6	1.21	3.53	4.07
	20	7	1.36	2.91	3.36
	25	7	1.55	3.32	3.83
	30	8	1.70	2.79	3.22
270° Arc	15	6	1.11	3.95	4.55
	20	7	1.24	3.24	3.74
	25	7	1.41	3.69	4.25
	30	8	1.55	3.10	3.58
180° Arc	15	6	0.84	4.49	5.18
	20	7	0.97	3.81	4.40
	25	7	1.09	4.28	4.94
	30	8	1.19	3.58	4.13
90° Arc	15	6	0.51	5.46	6.29
	20	7	0.59	4.64	5.35
	25	7	0.66	5.19	5.98
	30	8	0.72	4.33	5.00

METRIC

5° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
330° Arc	1,0	1,8	0,27	0,08	91	105
	1,5	2,1	0,32	0,09	79	91
	2,0	2,3	0,38	0,11	78	90
	2,1	2,4	0,39	0,11	74	86
270° Arc	1,0	1,8	0,25	0,07	103	119
	1,5	2,1	0,30	0,08	91	105
	2,0	2,3	0,34	0,09	86	99
	2,1	2,4	0,35	0,10	81	94
180° Arc	1,0	1,8	0,19	0,05	117	135
	1,5	2,1	0,23	0,06	104	120
	2,0	2,3	0,26	0,07	98	113
	2,1	2,4	0,27	0,08	94	109
90° Arc	1,0	1,8	0,12	0,03	148	171
	1,5	2,1	0,14	0,04	127	147
	2,0	2,3	0,16	0,04	121	140
	2,1	2,4	0,16	0,04	111	128

10 Series VAN

10° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
360° Arc	15	7	1.93	3.80	4.39
	20	8	2.32	3.50	4.04
	25	9	2.52	3.00	3.46
	30	10	2.60	2.50	2.89
270° Arc	15	7	1.45	3.80	4.39
	20	8	1.75	3.50	4.04
	25	9	1.89	3.00	3.46
	30	10	2.10	2.70	3.12
180° Arc	15	7	0.97	3.80	4.39
	20	8	1.20	3.50	4.04
	25	9	1.26	3.00	3.46
	30	10	1.45	2.80	3.23
90° Arc	15	7	0.48	3.80	4.39
	20	8	0.58	3.50	4.04
	25	9	0.63	3.00	3.46
	30	10	0.75	2.90	3.35

METRIC

10° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
360° Arc	1,0	2,1	0,44	0,12	96	111
	1,5	2,4	0,53	0,15	89	103
	2,0	2,7	0,57	0,16	76	88
	2,1	3,1	0,59	0,16	63	73
270° Arc	1,0	2,1	0,33	0,09	96	111
	1,5	2,4	0,40	0,11	89	103
	2,0	2,7	0,43	0,12	76	88
	2,1	3,1	0,48	0,13	68	79
180° Arc	1,0	2,1	0,22	0,06	97	112
	1,5	2,4	0,27	0,08	92	106
	2,0	2,7	0,29	0,08	76	88
	2,1	3,1	0,33	0,09	71	82
90° Arc	1,0	2,1	0,11	0,03	96	110
	1,5	2,4	0,13	0,04	89	103
	2,0	2,7	0,14	0,04	76	88
	2,1	3,1	0,17	0,05	73	85

■ *Square spacing based on 50% diameter of throw.*
▲ *Triangular spacing based on 50% diameter of throw.*

NOTE: Turning the radius reduction screw may be required to achieve catalog radius and flow when the arc is set at less than maximum arc.

12 Series VAN

15° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
360° Arc	15	9	1.80	2.14	2.47
	20	10	2.10	2.02	2.34
	25	11	2.40	1.91	2.21
	30	12	2.60	1.74	2.01
270° Arc	15	9	1.35	2.14	2.47
	20	10	1.58	2.02	2.34
	25	11	1.80	1.91	2.21
	30	12	1.95	1.74	2.01
180° Arc	15	9	0.90	2.14	2.47
	20	10	1.05	2.02	2.34
	25	11	1.20	1.91	2.21
	30	12	1.30	1.74	2.01
90° Arc	15	9	0.45	2.14	2.47
	20	10	0.53	2.02	2.34
	25	11	0.60	1.91	2.21
	30	12	0.65	1.74	2.01

METRIC

15° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
360° Arc	1,0	2,7	0,40	0,11	55	63
	1,5	3,2	0,48	0,14	47	54
	2,0	3,6	0,59	0,16	46	53
	2,1	3,7	0,60	0,16	44	51
270° Arc	1,0	2,7	0,30	0,09	55	63
	1,5	3,2	0,36	0,10	47	54
	2,0	3,6	0,45	0,12	46	53
	2,1	3,7	0,45	0,12	44	51
180° Arc	1,0	2,7	0,20	0,06	55	63
	1,5	3,2	0,24	0,07	47	54
	2,0	3,6	0,30	0,08	46	53
	2,1	3,7	0,30	0,08	44	51
90° Arc	1,0	2,7	0,10	0,03	55	63
	1,5	3,2	0,12	0,03	47	54
	2,0	3,6	0,15	0,04	46	53
	2,1	3,7	0,15	0,04	44	51

15 Series VAN

23° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
360° Arc	15	11	2.60	2.07	2.39
	20	12	3.00	2.01	2.32
	25	14	3.30	1.62	1.87
	30	15	3.70	1.58	1.83
270° Arc	15	11	1.95	2.07	2.39
	20	12	2.25	2.01	2.32
	25	14	2.48	1.62	1.87
	30	15	2.78	1.58	1.83
180° Arc	15	11	1.30	2.07	2.39
	20	12	1.50	2.01	2.32
	25	14	1.65	1.62	1.87
	30	15	1.85	1.58	1.83
90° Arc	15	11	0.65	2.07	2.39
	20	12	0.75	2.01	2.32
	25	14	0.82	1.62	1.87
	30	15	0.92	1.58	1.83

METRIC

23° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
360° Arc	1,0	3,4	0,60	0,16	52	60
	1,5	3,9	0,72	0,19	47	55
	2,0	4,5	0,84	0,23	41	48
	2,1	4,6	0,84	0,23	40	46
270° Arc	1,0	3,4	0,45	0,12	52	60
	1,5	3,9	0,54	0,15	47	55
	2,0	4,5	0,63	0,17	41	48
	2,1	4,6	0,63	0,18	40	46
180° Arc	1,0	3,4	0,30	0,08	52	60
	1,5	3,9	0,36	0,10	47	55
	2,0	4,5	0,42	0,11	41	48
	2,1	4,6	0,42	0,12	40	46
90° Arc	1,0	3,4	0,15	0,04	52	60
	1,5	3,9	0,18	0,05	47	55
	2,0	4,5	0,21	0,06	41	48
	2,1	4,6	0,21	0,06	40	46

18 Series VAN NEW!

26° Trajectory

Nozzle	Pressure psi	Radius ft.	Flow GPM	Precip. in/h ■	Precip. in/h ▲
360° Arc	15	14	4.21	2.07	2.39
	20	15	4.70	2.01	2.32
	25	17	4.86	1.62	1.87
	30	18	5.32	1.58	1.83
270° Arc	15	14	3.16	2.07	2.39
	20	15	3.52	2.01	2.32
	25	17	3.65	1.62	1.87
	30	18	3.99	1.58	1.83
180° Arc	15	14	2.11	2.07	2.39
	20	15	2.35	2.01	2.32
	25	17	2.43	1.62	1.87
	30	18	2.66	1.58	1.83
90° Arc	15	14	1.05	2.07	2.39
	20	15	1.17	2.01	2.32
	25	17	1.22	1.62	1.87
	30	18	1.33	1.58	1.83

METRIC

26° Trajectory

Nozzle	Pressure Bars	Radius m	Flow m³/h	Flow l/s	Precip. mm/h ■	Precip. mm/h ▲
360° Arc	1,0	4,3	0,96	0,27	52	60
	1,5	4,8	1,07	0,30	47	55
	2,0	5,4	1,20	0,33	41	48
	2,1	5,5	1,21	0,34	40	46
270° Arc	1,0	4,3	0,72	0,20	52	60
	1,5	4,8	0,80	0,22	47	55
	2,0	5,4	0,90	0,25	41	48
	2,1	5,5	0,91	0,25	40	46
180° Arc	1,0	4,3	0,48	0,13	52	60
	1,5	4,8	0,54	0,15	47	55
	2,0	5,4	0,60	0,17	41	48
	2,1	5,5	0,61	0,17	40	46
90° Arc	1,0	4,3	0,24	0,07	52	60
	1,5	4,8	0,27	0,08	47	55
	2,0	5,4	0,30	0,08	41	48
	2,1	5,5	0,30	0,08	40	46

■ *Square spacing based on 50% diameter of throw.*
▲ *Triangular spacing based on 50% diameter of throw.*

NOTE: Turning the radius reduction screw may be required to achieve catalog radius and flow when the arc is set at less than maximum arc.

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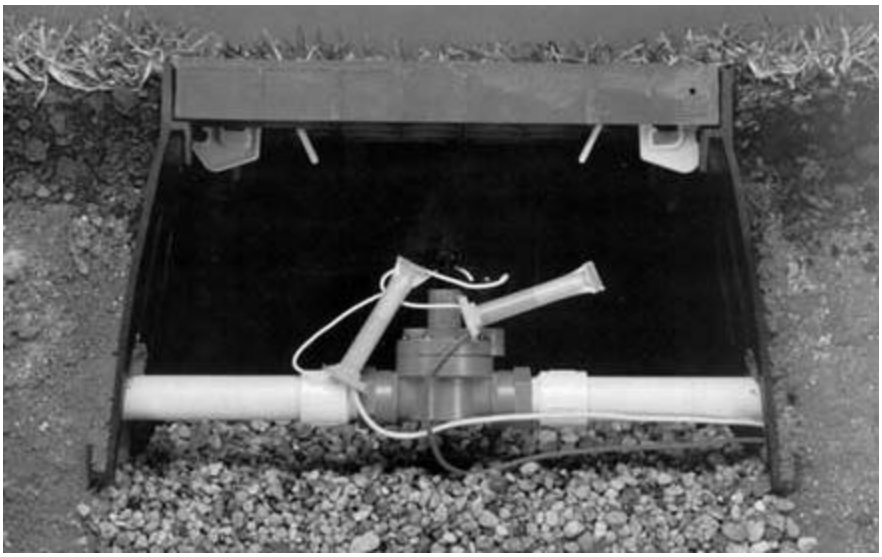
Rain Bird. Conserving More Than Water

D39287A

Data Sheet

DBY/DBR and DBY-6/DBR/6

Direct Bury Splice Kits



3M Has Your Wiring Needs Covered

3M DBY/DBR Direct Bury Splice Kits are real time savers when installing underground electrical systems. Every component for the splice is included in the kit. The insulator tube is pre-filled, eliminating the chance of the installer using too much or too little sealant. No crimping tools, no waste, no mess. Just quick, reliable underground splices for irrigation and sprinkler systems, landscape lighting and other 30-volt underground projects. The splice may re-entered without cutting the wires (new tube required)

Flexibility

- The DBY and DBY-6 splice kit connects a wire range of 2-5 #18 AWG through 2 #12 plus 1 #16 AWG solid or stranded copper wire.
- The DBR and DBR-6 splice kit connects a wire range of 5 #16 AWG through 3 #10 AWG solid or stranded copper wire.
- Sealant does not set up hard, allowing splice to be reworked without cutting wires (new tube required).
- Application temperature range: 32º - 120ºF (0º - 49ºC).
- Storage Temperature: 120ºF (49ºC) maximum.

Economy

- Insulating gel is already contained in the tube.
- Long-term electrical properties reduce callbacks and rework.

Dependability

- Locking fingers in the tube ensure that the Scotchlok™ connector stays in position.
- The closed tube cover provides strain relief
- Design protects against corrosion failure.

The Scotchlok™ Y and R connectors are UL listed. When assembled in the tubes of the DBY-6 and DBR-6 products, the splices are UL listed for 600 volts maximum as a wire connector system for use with underground conductors.

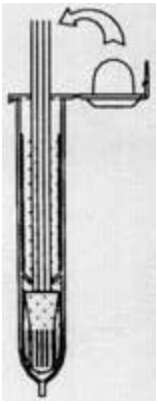
Product	Wire Range	Agency Listing
DBY	18-12 AWG	-
DBR	16-10 AWG	-
DBY-6	18-12 AWG	UL, CSA
DBR-6	16-10 AWG	UL, CSA

For Use In:

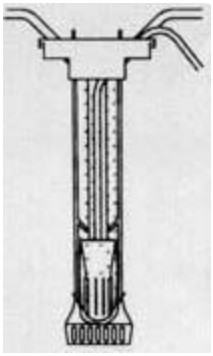
- Sprinkler Systems
- Outdoor Lighting
  (Decks, driveways, lamp posts, landscape)
- Septic Systems
- Golf Courses
- Other underground electrical wiring applications

Easy as 1, 2, 3

1. Strip wires, apply the Scotchlok electrical connector and twist in a clockwise direction.



2. Insert the splice into the gel-filled insulator tube. Push past the locking fingers to hold the Scotchlok connector in place.



3. Position wire channels and snap insulator tube cover closed.

The DBY-6 kit contains 2 Scotchlok Y connectors and has a wire range of 2-5 #18 AWG through 2 #12 AWG plus 1 #16 AWG solid or stranded copper wire. The DBR-6 kit contains 2 Scotchlok R connectors and has a wire range of 5 #16 AWG through 3 #10 AWG solid or stranded copper wire.
The DBY wire range is 2-5 #18 AWG through 2 # 12 AWG and the DBR wire range is 5 #16 AWG through 3 #10 AWG.

Listed
98U1

Voltage: 600 Volts Maximum Wire Connector System For Use With Underground Conductors
Non-U.V. stable

3M Electrical Products Division
6801 River Place Blvd.
Austin, Texas 78726 - 9000

3M

P.O. Box 368, Union, NJ 07083-0368, 908-687-7810, 800-327-2443, Fax: 908-687-2722

Paige spec P7001D-Rev 3

UNDERGROUND FEEDER CABLE (UF)

INSULATION: POLYVINYL CHLORIDE

SIZES: 14 AWG - 4/0 AWG

1.0 SCOPE:

1.1 This specification covers the construction requirements for Underground Feeder Cable, Type UF, for use in accordance with the National Electrical Code or operation at a potential of 600 Volts or less and at a temperature of 75°C or less. UL listed.

2.0 CONSTRUCTION:

2.1 ***Conductor:***
Soft drawn bare copper meeting the requirements of ASTM specification B-3 or B-8.

2.2 ***Temperature Rating:***
-10°C +75°C.

2.3 ***Insulation:***
Polyvinyl chloride, 75°C rated conforming to UL Standards 493 and 83.

2.4 ***Manufacturer's Identification:***
Surface marked with Paige-Electric, voltage rating, size and type, and UL file number.

2.5 ***Underwriters' Laboratories Approval:***
All cables shall be tested physically and electrically in accordance with UL Standard 493, and 83 (paragraphs 28.1, 29.1 and 29.2). All reels and cartons bear UL labels.

SIZE AWG	STRAND-ING	INSULATION WALL (MILS)	APPROX. DIAMETER (INCHES)	CURRENT CARRY CAPACITY*
14	SOLID	.060	.190	15
12	SOLID	.060	.205	20
10	SOLID	.060	.225	30
8	SOLID	.080	.285	40
14	7	.060	.200	15
12	7	.060	.215	20
10	7	.060	.240	30
8	7	.080	.300	40
6	7	.080	.340	55
4	7	.080	.390	70
2	7	.080	.450	95
1	19	.095	.520	110
1/0	19	.095	.560	125
2/0	19	.095	.605	145
3/0	19	.095	.660	165
4/0	19	.095	.715	195

*Current carrying capacity based on not more than 3 conductors in raceway or cable or direct burial (at room temperature of 30°C)

Paige spec P7079D - Rev 7

DIRECT BURIAL
GOLF COURSE SPRINKLER WIRE
INSULATION: POLYETHYLENE
SIZES: 14 AWG - 10 AWG SOLID

1.0 SCOPE:

1.1 This specification covers single conductor insulated wire sizes 14 AWG, through 10 AWG, utilizing low density high molecular weight polyethylene insulation, suitable for direct burial applications for operation up to 600 volts and conductor temperatures up to 60°C. UL listed.

2.0 CONSTRUCTION:

2.1 ***Conductor:***
Soft drawn bare copper meeting the requirements of ASTM specification B-3 or B-8.

2.2 ***Temperature Rating:***
-55°C +60°C.

2.3 ***Insulation Thickness:***
.045"

2.4 ***Manufacturer's Identification:***
Surface marked with Paige-Electric, voltage rating, size and type, and UL file number.

2.5 ***Underwriters' Laboratories Approval:***
All cables shall be tested physically and electrically in accordance with UL Standard 493, and 83 (paragrahs 28.1, 29.1 and 29.2). All reels and cartons bear UL labels.

2.6 ***Tests:***
Material must be able to pass the following tests without showing signs of degradation.

2.6.1 COLD BEND:
The insulation shall not show any cracks when sample is bent around a mandrel of 3 x wire diameter, after being subjected to -55°C ± 1°C for one (1) hour.

2.6.2 ELECTRICAL:
AC test voltage, 5 minutes at 3,000 volts.

2.6.3 ENVIRONMENTAL AGING:
Immersed for 14 days in concentrated solutions of fertilizers, herbicides and insecticides.

2.7 INSULATION COMPARISON WITH PVC TYPE UF AND TWU - 40

	PE	PVC TYPE UF	PVC TYPE TWU -40
TEMPERATURE RANGE	-55° +60°C	-10° +60°C	-55° +60°C
TENSILE STRENGTH	1400 PSI	1500 PSI	1800 PSI
INS. RES. (MEG.OHMS/1000')	50,000	200	152
ELONGATION	EXCELLENT	GOOD	GOOD
MOISTURE RES.	EXCELLENT	GOOD	FAIR
COLD BEND	EXCELLENT	GOOD	EXCELLENT
ABRASION	GOOD	GOOD	FAIR

2.8 ***Splicing Recommendations:***
Splicing can be accomplished using 3M or equivalent epoxy type compounds, fusible heat shrink tubing, Paige Electric DBM, or 3M DBY connectors. PVC adhesives or sealing compounds are not recommended.

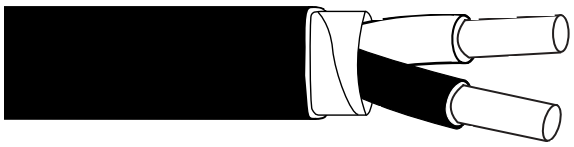
*CSA LISTING AVAILABLE WITH THINNER INSULATION ON REQUEST.

UL AND CSA DUAL LISTING AVAILABLE WITH .045" INSULATION ONLY.

P.O. Box 368, Union, NJ 07083-0368, 908-687-7810, 800-327-2443, Fax: 908-687-8860

Paige spec **P7168D - Rev 4**

ARMORED DIRECT BURIAL WIRE
INSULATION: POLYVINYL CHLORIDE
ARMOR: TYPE 304 STAINLESS STEEL TAPE
OUTER JACKET: SUNLIGHT RESISTANT PVC
SIZES: 14 - 10 AWG AND 2.5mm², 2 or 3 CONDUCTORS 600 VOLTS



1.0 SCOPE:

1.1 This specification covers a two or three conductor direct burial twisted cable utilizing UL Listed Type UF conductors, armored with stainless steel and having a sunlight resistant jacket overall making it rodent proof. The armor also provides a shield from lightning when connected to earth ground.

2.0 CONSTRUCTION:

2.1 ***Conductors:***
14, 12, 10 AWG, or 2.5mm² Class B solid annealed uncoated copper conforming to ASTM B-8.

2.2 ***Insulation:***
Polyvinyl chloride conforming to UL Style Type UF 60°C, 600 Volts, average thickness not less than 60 mils. Colors for 2 conductor cable are white and red. Colors for 3 conductor cable are black, white and red.

2.3 ***Cable:***
6" Lay

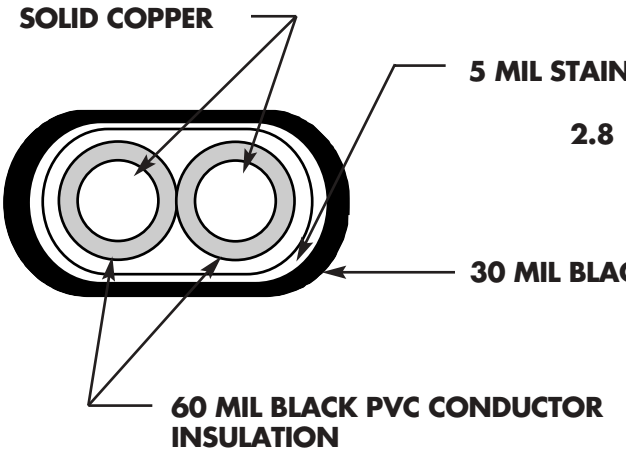
2.4 ***Armor:***
A .005" x .500" Type 304 stainless steel tape is helically wrapped over the two conductors with a 33% minimum overlap.

2.5 ***Outer Jacket:***
Sunlight resistant black PVC conforming to ICEA S-61-402, NEMA WC5 and UL 1263, nominal thickness 30 mils.

2.6

NO. OF COND.	O.D. 14 AWG	12 AWG	10 AWG	2.5MM²
2	.475"	.520"	.570"	.450
3	.485"	–	–	–

2.7 ***Surface Marking:***
"Paige P7168D Size Number of conductors 600 Volts Armored (Rodent Proof)"

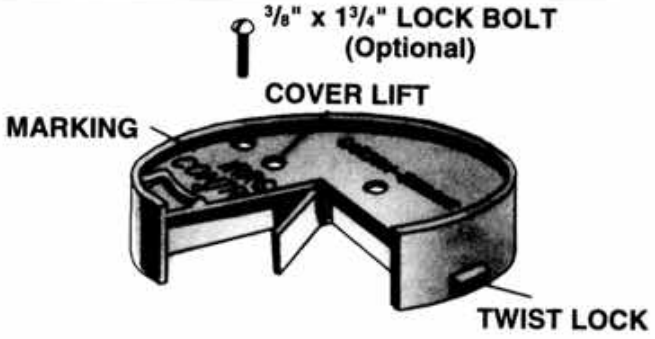


2.8 ***Special Packaging:***
Packaging to be per Paige Specification P7141D

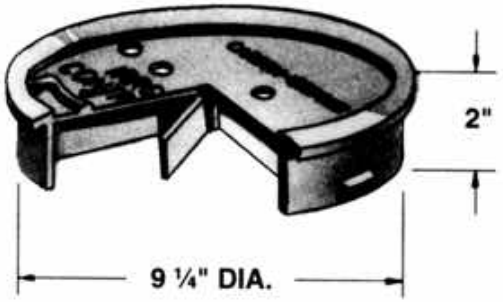
Small Box Series
General Detail

Model 910

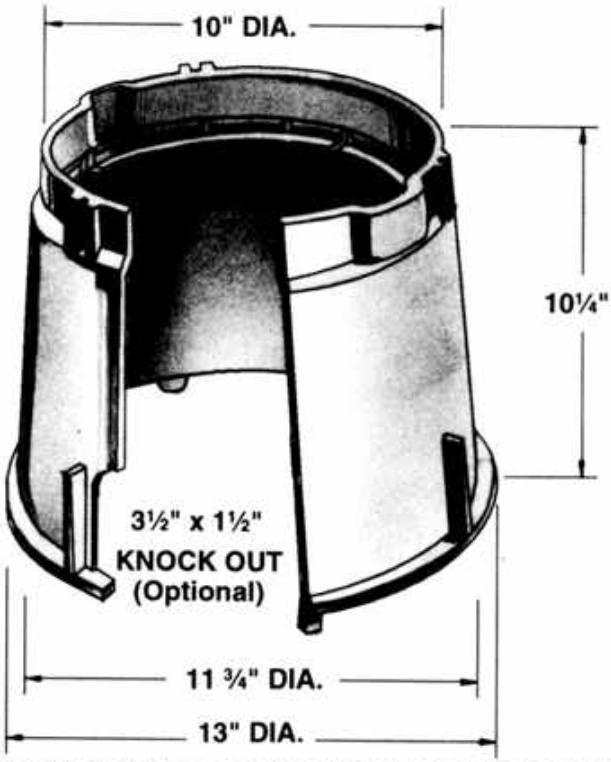
910 Cover
Weight: HDPE 1½ lbs.
Part No: 910-2 Non Bolt
Part No: 910-2B Bolt Down



910 T-Cover
Weight: HDPE 1½ lbs.
Part No: 910-4 Non Bolt
Part No: 910-4B Bolt Down



910 Body
Weight: HDPE 3 lbs.
Part No: 910-10



Colors Available:
Green or Grey
Black, Tan or
Violet (Reclaimed Water)
on Special Order

* NOTE: For use in non-vehicular traffic installations only. We do NOT recommend installation in concrete or asphalt. Weights and dimensions may vary slightly.

Revision Date 1/1/98

CARSON INDUSTRIES LLC
Glendora, California
Toll-Free: (800) 735-5566
Phone: (909) 592-6272
Fax: (909) 592-7971

CARSON INDUSTRIES, LTD.
Roscommon, Ireland
Phone: 35 39 03-25922
Fax: 35 39 03-25921

Technical Specifications & Shipping Information

Model 910

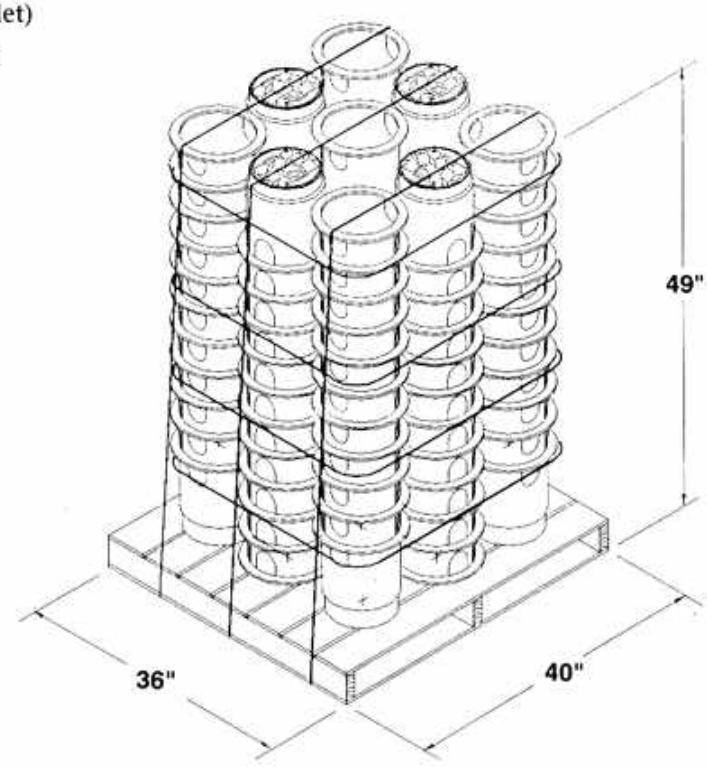
Properties of Unfoamed Resin	ASTM Test Method	HDPE
Tensile Strength	D-638	3,100-5,500 PSI
Flexural Modulus	D-790	160,000-210,000 PSI
Notched Izod Impact Strength	D-256	5-15 ft. lbs./in.
Deflection Temperature	D-648	165° to 180°F.
Density	D792	Minimum .955
Chemical Resistance	—	Excellent
Water Absorbtion	—	Nil

Static Vertical Load Rating

- Body with HDPE Cover = 350 PSF

Shipping Configuration

- Units packed in cubes of 99 assemblies (cover & bodies)
- Nests 3¼" within each other
- 99 pack = 42.87 cu. ft. (includes pallet)
- Units ship as: 445.5 lbs. per 99 pack (excludes pallet weight)



* NOTE: For use in non-vehicular traffic installations only. We do NOT recommend installation in concrete or asphalt. Weights and dimensions may vary slightly.

Revision Date 1/1/98

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CARSON INDUSTRIES, LTD.
Roscommon, Ireland
Phone: 35 39 03-25922
Fax: 35 39 03-25921

PRODUCT BULLETIN – SPECIFICATIONS

WELD-ON 711

GENERAL DESCRIPTION:

Weld-On 711 is a gray, heavy bodied, medium set, high strength solvent cement for cementing all schedules and classes of PVC pipe and fittings through 12" including Schedule 80. It has excellent gap filling properties and is especially recommended where a sizable gap exists between pipe and fitting - e.g., in Schedule 80 and large pipe sizes. Weld-On 711 may also be used on small size pipe.

APPLICATION:

Weld-On 711 is for use on all types of PVC plastic pipe applications, Type I and Type II. It is approved for use with potable water pressure systems, irrigation, turf irrigation, gas, conduit, industrial pipe applications, sewer and drain, waste and vent systems.

Detailed directions on making solvent cemented joints are printed on the container label. An installation video covering solvent cementing of PVC is available. It not only describes the basic principles of solvent cementing, but also covers the handling, storage and use of our products. It is also highly recommended that the installer review the instructions supplied by the pipe and fitting manufacturer. NOTE: IPS Weld-On solvent cements must never be used in a system using or being tested by compressed air or gases.

AVAILABILITY:

This product is available in 1/2 pint, 1 pint, 1 quart and 1 gallon metal cans. For detailed information on containers and applicators, see our current Price List.

STANDARDS AND APPROVALS:

Weld-On 711 meets ASTM D-2564 and is listed by NSF International for use on potable water, sewer, drain waste and vent systems. It is listed by (IAPMO), the International Association of Plumbing & Mechanical Officials and carries the Uniform Plumbing Code (UPC) seal. Weld-On 711 is listed by the Canadian Standards Association (CSA) for pressure and non-pressure applications. This cement is suitable for use with PVC piping systems approved by (SBCC) Southern Building Code Congress and (BOCA) Building Officials Congress of America.

SPECIFICATIONS:

Weld-On 711 conforms to these requirements:

COLOR:	Gray
RESIN:	Must be virgin PVC
SPECIFIC GRAVITY:	0.946 ± 0.040
BROOKFIELD VISCOSITY:	1600-3000 CPS (Centipoises at 73±2°F)

SHELF LIFE:

3 years expectancy in tightly sealed containers. The date of manufacture is stamped on the bottom of the container. Stability of the product is limited by the permanence of the container and the evaporation of the solvent when container is open. Evaporation of solvent will cause the cement to thicken and reduce its effectiveness. Adding of thinners to change viscosity is not recommended.

SHIPPING:

Shipping Information for Gallon and Above: DOT Hazard Class: 3. DOT Shipping Name: Adhesive. Identification Number: UN 1133. Packaging Group: II. Label Required: Flammable.

Shipping Information for Less than One Gallon:

DOT Shipping Name: Consumer Commodity. DOT Hazard Class: ORM-D.

SAFETY PRECAUTIONS:

This product is flammable and considered a hazardous material. In conformance with the Federal Hazardous Substances Labeling Act, the following hazards and precautions are given. Purchasers who may repackage this product must also conform to all local, state and federal labeling, safety and other regulations.

DANGER - EXTREMELY FLAMMABLE - VAPOR HARMFUL
MAY BE HARMFUL IF SWALLOWED - MAY IRRITATE SKIN OR EYES

Keep out of reach of children. Do not take internally. Keep away from heat, spark, open flame and other sources of ignition. Vapors may ignite explosively. Keep container closed when not in use. Store in the shade below 110°F. Avoid breathing of vapors. Use only in well ventilated area. If confined or partially enclosed, use forced ventilation. Atmospheric levels must be maintained below established exposure limits contained in Section Il of the Material Safety Data Sheet. If airborne concentrations exceed those limits, use of a NIOSH-approved organic vapor cartridge respirator with full face-piece is recommended. The effectiveness of an air purifying respirator is limited. Use it only for a single short-term exposure. For emergency and other conditions where short term exposure guidelines may be exceeded, use an approved positive pressure self-contained breathing apparatus. Do not smoke, eat or drink while working with this product. Avoid contact with skin, eyes and clothing. May cause eye injury. Protective equipment such as gloves, goggles and impervious apron should be used. Carefully read Material Safety Data Sheet and follow all precautions. Contains Tetrahydrofuran (109-99-9), Methyl Ethyl Ketone (78-93-3), Cyclohexanone (108-94-1) and PVC Resin (9002-86-2). Do not use this product for other than intended use.

FIRST AID:

Inhalation: If ill effects from inhalation, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call physician.

Eye or Skin Contact: Flush with plenty of water for 15 minutes. If irritation persists, get medical attention.

Ingestion: If swallowed, do not induce vomiting. Contact physician immediately.

"Title Ill Section 313 Supplier Notification": This product contains toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR372. This information must be included in all MSDSs that are copied and distributed for this material.

SPECIAL PRECAUTION:

Do not use a dry granular calcium hypochlorite as a disinfecting material for water purification in potable water piping systems. The introduction of granules or pellets of calcium hypochlorite with PVC and CPVC solvent cements and primers (including their vapors) may result in a violent chemical reaction if a water solution is not used. It is advisable to purify lines by pumping chlorinated water into the piping system - this solution will be non-volatile. Furthermore, dry granular calcium hypochlorite should not be stored or used near solvent cements and primers.

QUALITY ASSURANCE:

Every batch of this product is checked to assure that consistent quality is maintained. An infrared absorption curve is recorded for each batch to ensure that this product was properly formulated. Samples are taken from all batches and kept for a period of at least one year. A batch identification code is stamped on each can.

IMPORTANT NOTE:

This product is intended for use by skilled individuals at their own risk. These suggestions and data are based on information we believe to be reliable. Installers should verify for themselves that they can make satisfactory joints under varying conditions. Toward this end, it is highly desirable that they receive personal instruction from trained instructors or competent, experienced installers. Contact us or your supplier for additional information or instruction.

IPS CORPORATION • 455 W. VICTORIA ST. • COMPTON, CA 90220 USA • (310) 898-3300 • FAX (310) 898-3392 • WEBSITE: www.ipscorp.com

PRODUCT BULLETIN – SPECIFICATIONS

Low VOC Emissions WELD-ON P-70 Primer

FOR PVC AND CPVC PIPE AND FITTINGS

GENERAL DESCRIPTION:

Weld-On P-70 Primer is a clear or purple colored, non-bodied, very fast acting, water thin solvent system. It is distinctly colored so that detection of its use in a joint can be made later. The strong action of P-70 Primer softens and dissolves the joining surfaces of PVC and CPVC pipe and fittings very rapidly. The benefit of this priming action is especially noticeable on parts being joined together in cold weather.

APPLICATION:

Weld-On P-70 Primer, when used in conjunction with appropriate Weld-On cements, will make consistently strong, well-fused joints. It is essential that the joining surfaces of pipe and fittings be softened prior to assembly. The main function of this primer is to expedite the penetration and softening of these surfaces. Its rate of penetration into the joining surfaces is much more rapid than that of cement alone. It is suitable for use with all types, schedules and classes of PVC and CPVC pipe and fittings.

Detailed directions on making solvent cemented joints are printed on the container label. An installation video covering solvent cementing of PVC is also available. It not only describes the basic principles, but also covers the handling, storage and use of our products. It is also highly recommended that the installer review the instructions supplied by the pipe and fitting manufacturer.

AVAILABILITY:

This product is available in 1/4 pint, 1/2 pint, 1 pint, 1 quart and 1 gallon metal cans. For detailed information on containers and applicators, see our current Price List.

STANDARDS AND APPROVALS

Weld-On P-70 meets ASTM F-656, SCAQMD Rule 1168 and is listed by NSF International for use on potable water, sewer and drain, waste and vent systems. P-70 Purple only is listed by (IAPMO), the International Association of Plumbing & Mechanical Officials and carries the Uniform Plumbing Code (UPC) seal. This primer is suitable for use with PVC and CPVC piping systems approved by (SBCC) Southern Building Code Congress and (BOCA) Building Officials Congress of America.

SPECIFICATIONS:

Weld-On P-70, in addition to meeting all the requirements of ASTM F-656, also conforms to these requirements:

VOC:	(As manufactured) 860 G/L
MAX VOC EMISSIONS:	650 G/L, Per SCAQMD Rule 1168, Method 316A
COLOR:	Purple or Clear
SPECIFIC GRAVITY:	0.870 ± 0.040
VISCOSITY:	Water Thin

SHELF LIFE:

3 years expectancy in tightly-sealed containers. The date of manufacture is stamped on the bottom of the container. Stability of the product is limited by the permanence of the container and the evaporation of the solvent when container is open.

SHIPPING:

Shipping Information for Gallon and Above: DOT Hazard Class: 3. DOT Shipping Name: Flammable Liquids N.O.S. (Tetrahydrofuran, Methyl Ethyl Ketone). Identification Number: UN 1993. Packaging Group: II. Label Required: Flammable Liquid.

Shipping Information for Less than One Gallon:
DOT Shipping Name: Consumer Commodity. DOT Hazard Class: ORM-D.

SAFETY PRECAUTIONS:

This product is flammable and considered a hazardous material. In conformance with the Federal Hazardous Substances Labeling Act, the following hazards and precautions are given. Purchasers who may repackage this product must also conform to all local, state and federal labeling, safety and other regulations.

DANGER - EXTREMELY FLAMMABLE - VAPOR HARMFUL
MAY BE HARMFUL IF SWALLOWED - MAY IRRITATE SKIN OR EYES

Keep out of reach of children. Do not take internally. Keep away from heat, spark, open flame and other sources of ignition. Vapors may ignite explosively. Keep container closed when not in use. Store in the shade below 110°F. Avoid breathing of vapors. Use only in well ventilated area. If confined or partially enclosed, use forced ventilation. Atmospheric levels must be maintained below established exposure limits contained in Section II of the Material Safety Data Sheet. If airborne concentrations exceed those limits, use of a NIOSH-approved organic vapor cartridge respirator with full face-piece is recommended. The effectiveness of an air purifying respirator is limited. Use it only for a single short-term exposure. For emergency and other conditions where short term exposure guidelines may be exceeded, use an approved positive pressure self-contained breathing apparatus. Do not smoke, eat or drink while working. Avoid contact with skin, eyes and clothing. May cause eye injury. Protective equipment such as gloves, goggles and impervious apron should be used. Carefully read Material Safety Data Sheet and follow all precautions. Contains Tetrahydrofuran (109-99-9), Methyl Ethyl Ketone (78-93-3) and Cyclohexanone (108-94-1). Do not use this product for other than intended use.

FIRST AID:

Inhalation: If ill effects from inhalation, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call physician.

Eye or Skin Contact: Flush with plenty of water for 15 minutes. If irritation persists, get medical attention.

Ingestion: If swallowed, do not induce vomiting. Contact physician immediately.

"Title III Section 313 Supplier Notification": This product contains toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR372. This information must be included in all MSDSs that are copied and distributed for this material.

SPECIAL PRECAUTION:

Do not use a dry granular calcium hypochlorite as a disinfecting material for water purification in potable water piping systems. The introduction of granules or pellets of calcium hypochlorite with PVC and CPVC solvent cements and primers (including their vapors) may result in a violent chemical reaction if a water solution is not used. It is advisable to purify lines by pumping chlorinated water into the piping system - this solution will be non-volatile. Furthermore, dry granular calcium hypochlorite should not be stored or used near solvent cements and primers.

QUALITY ASSURANCE:

Every batch of this product is checked to assure that consistent quality is maintained. An infrared absorption curve is recorded for each batch to ensure that this product was properly formulated. Samples are taken from all batches and kept for a period of at least one year. A batch identification code is stamped on each can.

IMPORTANT NOTE:

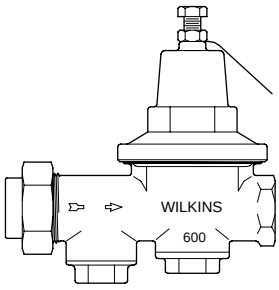
This product is intended for use by skilled individuals at their own risk. These suggestions and data are based on information we believe to be reliable. Installers should verify for themselves that they can make satisfactory joints under varying conditions. Toward this end, it is highly desirable that they receive personal instruction from trained instructors or competent, experienced installers. Contact us or your supplier for additional information or instruction.

O

WILKINS
A ZURN COMPANY

Model 600

Water Pressure Reducing Valve
with Integral By-pass Check Valve and strainer



APPLICATION

Designed for installation on potable water lines to reduce high inlet pressure to a lower outlet pressure. The integral strainer makes this device most suitable for residential and commercial water systems requireing frequent cleaning because of sediment and debris. The balanced piston design enables the regulator to react in a smooth and responsive manner to changes in system flow demand, while at the same time, providing protection from inlet pressure changes.

FEATURES

Sizes: ❑ ½" ❑ ¾" ❑ 1" ❑ 1¼" ❑ 1½" ❑ 2"

Maximum working water pressure	300 psi
Maximum working water temperature	180°F
Reduced pressure range (standard)	25 psi to 75 psi
Factory preset	50 psi
Hydrostatic test pressure	300 psi
End connectionsThreaded	ANSI B1.20.1

OPTIONS

(Suffixes can be combined)

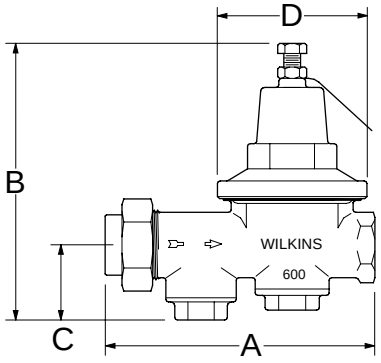
- ❑ C - copper sweat connection (3/4" thru 2")
- ❑ DM - double male meter tailpiece connection (3/4"); 1" National Hose Thread fits 5/8" x 3/4" and 3/4" water meters (no union included)
- ❑ HR - 75 psi to 125 psi spring range, factory set at 85 psi
- ❑ HLR - 10 psi to 125 psi springe range, factory set at 85 psi
- ❑ HT - 210°F maximum temp
- ❑ L - less integral by-pass check valve
- ❑ LU - less union assembly, female x female
- ❑ LPV - 210°F maximum temp with 10 psi to 35 psi spring range, factory set at 20 psi
- ❑ LPC - 180°F maximum temp with 10 psi to 35 psi spring range, factory set at 20 psi
- ❑ SC - sealed cage bell housing and stainless steel adjustment screw
- ❑ 610 - 400 psi inlet rating and 75 psi to 125 psi spring range, factory set at 85 psi
- ❑ P - tapped and plugged for gauge

STANDARDS COMPLIANCE

- ❑ ASSE® Listed 1003
- ❑ IAPMO® Listed
- ❑ CSA® Certified
- ❑ City of Los Angeles Approved

MATERIALS

Main valve body	Cast Bronze ASTM B 584
Access covers	Cast Bronze ASTM B 584 Brass ASTM B 16
Fasteners	Stainless Steel, 300 Series
Stem & plunger	Cast Bronze ASTM B 584 Brass ASTM B 16
Elastomers	Buna Nitrile, (FDA Approved) EPDM, (FDA Approved)
Cap gaskets	Natural Vulcanized Fibre Acetal (Delrin™), NSF Listed
Strainer screen	Stainless Steel, 300 Series

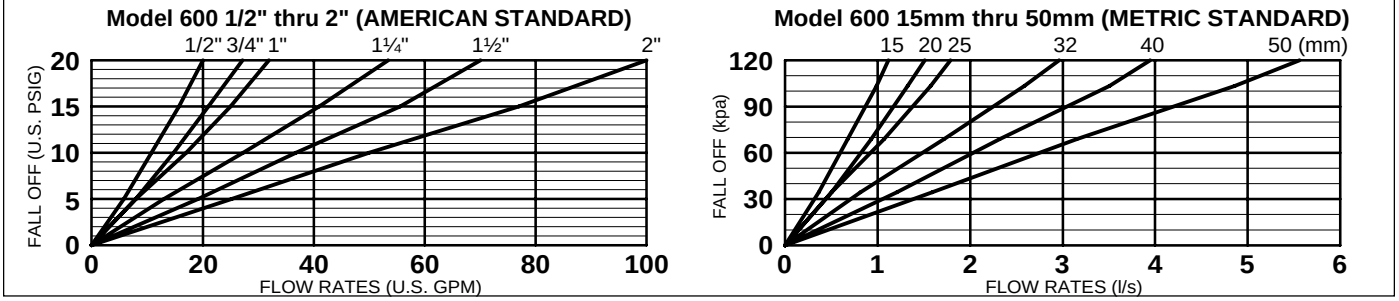


DIMENSIONS & WEIGHTS (do not include pkg.)

SIZE		CONNECTIONS	DIMENSIONS (approximate)								WEIGHT	
			A		B		C		D			
in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kg.
1/2	15	SINGLE UNION	5 1/4	133	6 1/4	159	1 1/4	32	2 3/4	70	3	1.5
1/2	15	LESS UNION	4 1/2	114	6 1/4	159	1 1/4	32	2 3/4	70	3	1.5
3/4	20	SINGLE UNION	5 5/16	135	5 1/2	140	1 1/4	32	2 3/4	70	3	1.5
3/4	20	LESS UNION	4 7/8	121	5 1/2	140	1 1/4	32	2 3/4	70	3	1.5
1	25	SINGLE UNION	6 1/8	156	7 1/4	184	2	51	3 3/8	86	5	2.5
1	25	LESS UNION	5 3/4	146	7 1/4	184	2	51	3 3/8	86	5	2.5
1 1/4	32	SINGLE UNION	7 1/8	181	8	203	2	51	3 7/8	100	7	3.0
1 1/2	40	SINGLE UNION	9 1/8	232	10	254	2 1/2	64	5	127	13	6.0
2	50	SINGLE UNION	10 1/4	260	12	305	3	76	6 1/2	165	21	9.5

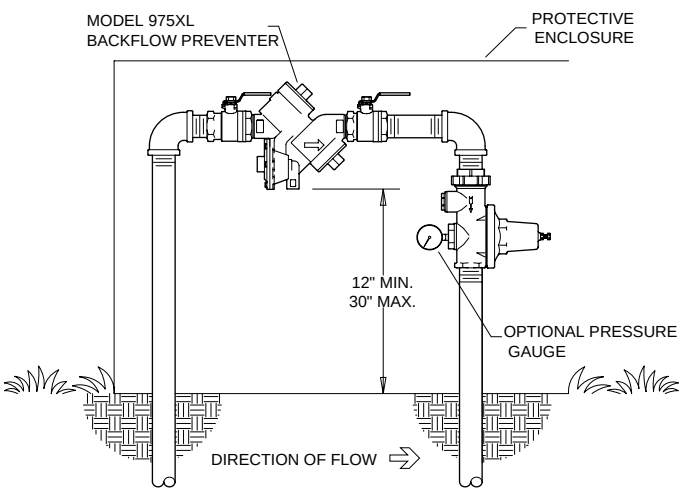
DOCUMENT NO. REG-600 | REV. 10/99

FLOW CHARACTERISTICS

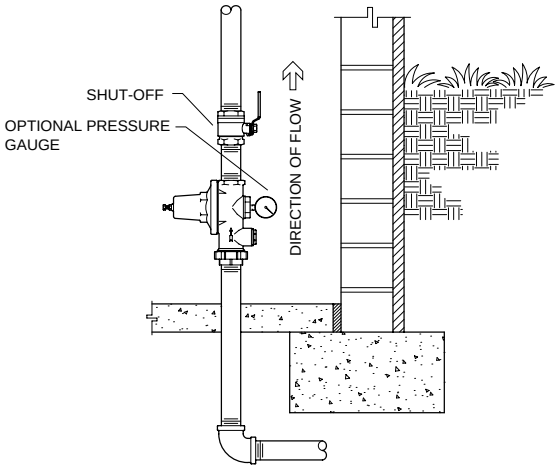


TYPICAL INSTALLATION

Local codes shall govern installation requirements. Unless otherwise specified, the assembly shall be mounted in accordance with the latest edition of the Uniform Plumbing Code. The Model 600 may be installed in any position. If installed in a pit, vault or inside application, specify the "SC" sealed cage option. Multiple installations are recommend for wide demand variations or where the desired pressure reduction is more than 4 to 1 (ie: 200 psi inlet reduced to 50 psi outlet). CAUTION: Anytime a reducing valve is adjusted, a pressure gauge must be used downstream to verify correct pressure setting. Do not bottom adjustment bolt on bell housing.



OUTDOOR INSTALLATION



VERTICAL INSTALLATION

SPECIFICATIONS

The Pressure Reducing Valve shall consist of a bronze body and bell housing, shall have separate access covers for the plunger and strainer screen and shall have a bolt to adjust the downstream pressure. The Pressure Reducing Valve shall be of the balanced piston design and shall reduce pressure in both flow and no-flow conditions. The bronze bell housing and access caps shall be threaded to the body and shall not require the use of ferrous screws. The Pressure Reducing Valve shall be a WILKINS Model 600.

WILKINS OPERATION OF ZURN PLUMBING PRODUCTS, 1747 Commerce Way, Paso Robles, CA 93446 Phone:805/238-7100 Fax:805/238-5766
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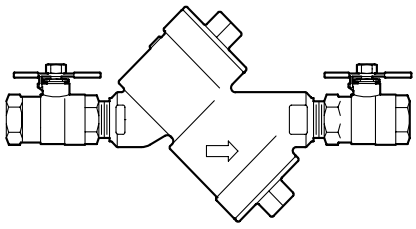
Model 950XL

Double Check Valve Assembly



APPLICATION

Designed for installation on potable water lines to protect against both backsiphonage and backpressure of polluted water into the potable water supply. Assembly shall provide protection where a potential health hazard does not exist.

FEATURES

Sizes: ❑ ¾" ❑ 1" ❑ 1¼" ❑ 1½" ❑ 2"

Maximum working water pressure	175 PSI
Maximum working water temperature	180°F
Hydrostatic test pressure	350 PSI
End connections Threaded	ANSI B1.20.1

STANDARDS COMPLIANCE

- ❑ ASSE® Listed 1015
- ❑ IAPMO® Listed
- ❑ CSA® Listed
- ❑ AWWA Compliant
- ❑ UL® Classified (less shut-off valves only)
- ❑ C-UL® Classified (less shut-off valves only)
- ❑ Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California
- ❑ City of Los Angeles Approved

OPTIONS

(Suffixes can be combined)

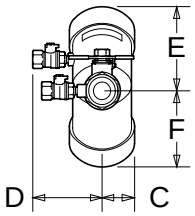
- ❑ - with full port QT ball valves (standard)
- ❑ L - less ball valves
- ❑ U - with union ball valves
- ❑ S - with bronze "Y" type strainer
- ❑ TCU - with test cocks "vertical" up
- ❑ V - with union swivel elbows
- ❑ OSY - with OS & Y gate valves
- ❑ FDC - with fire hydrant connection (2" only)
- ❑ FT - with integral male 45° flare SAE test fitting

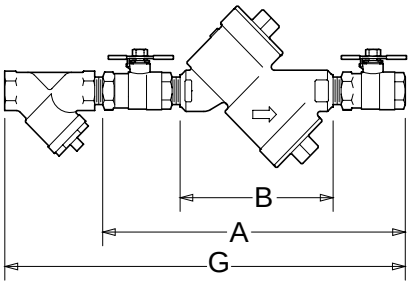
MATERIALS

Main valve body	Cast Bronze ASTM B 584
Access covers	Cast Bronze ASTM B 584
Internals	Stainless Steel, 300 Series
Elastomers	Silicone (FDA approved)
	Buna Nitrile (FDA approved)
Polymers	Noryl™, NSF Listed
Springs	Stainless steel, 300 series

ACCESSORIES

- ❑ Repair kit (rubber only)
- ❑ Thermal expansion tank (Model WXTP)



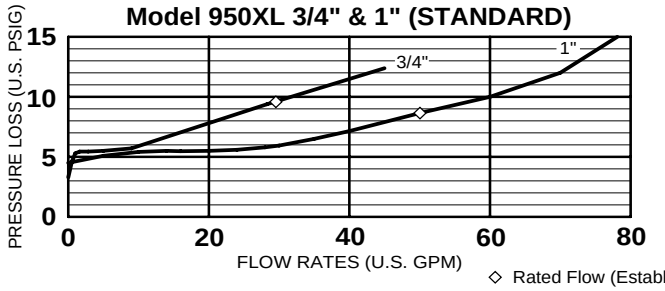


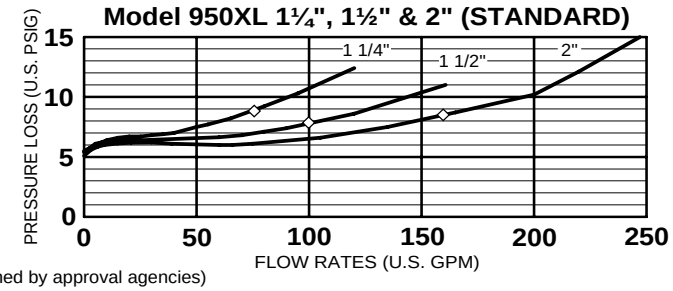
DIMENSIONS & WEIGHTS (do not include pkg.)

MODEL SIZE	DIMENSIONS (INCHES)								WEIGHT (LBS)	
	A	A UNION BALL VALVES	B LESS BALL VALVES	C	D	E	F	G	LESS BALL VALVES	WITH BALL VALVES
3/4"	11.25	12.50	7.00	1.50	3.00	3.50	3.00	15.00	5.0	9.0
1"	13.00	13.75	7.00	1.50	3.00	3.50	3.00	17.75	8.0	9.0
1 1/4"	16.50	18.50	10.58	2.00	3.50	4.50	4.50	21.50	16.0	21.0
1 1/2"	17.12	19.12	10.58	2.00	3.50	4.50	4.50	22.75	16.0	24.0
2"	18.25	20.00	10.58	2.00	3.50	4.50	4.50	25.12	16.0	27.0

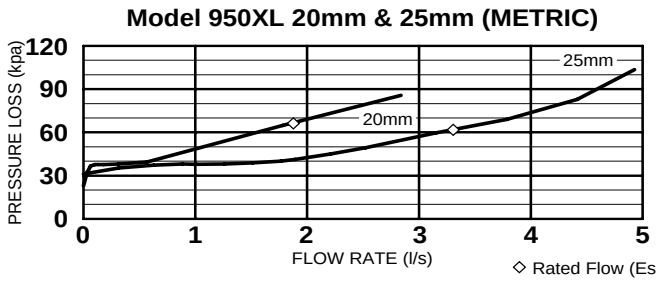
DOCUMENT NO. BF-950XL | REV. 7/99

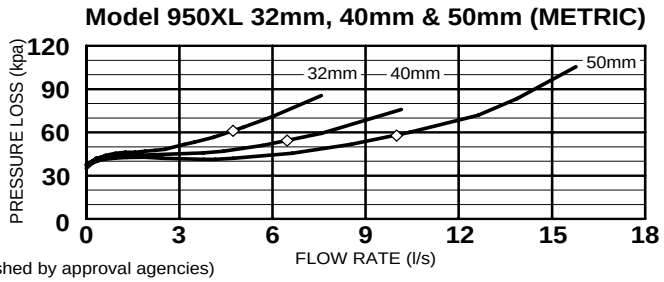
FLOW CHARACTERISTICS





◇ Rated Flow (Established by approval agencies)



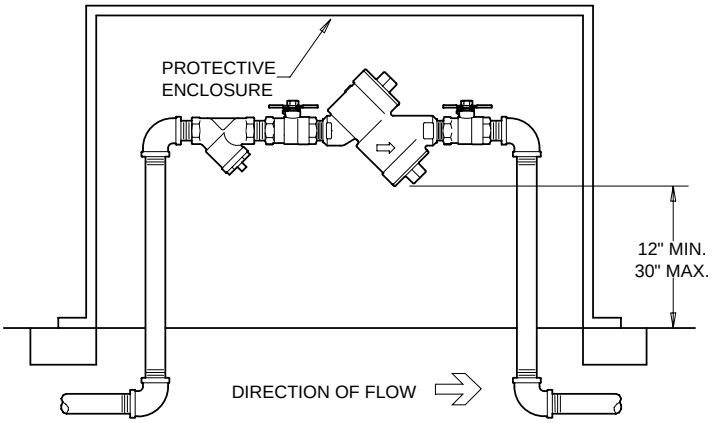


◇ Rated Flow (Established by approval agencies)

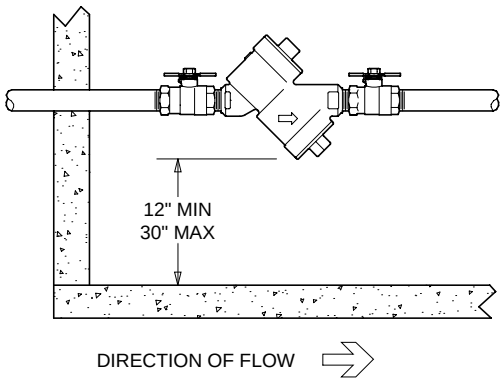
TYPICAL INSTALLATION

Local codes shall govern installation requirements. To be installed in accordance with the manufacturer's instructions and the latest edition of the Uniform Plumbing Code. Unless otherwise specified, the assembly shall be mounted at a minimum of 12" (305mm) and a maximum of 30" (762mm) above adequate drains with sufficient side clearance for testing and maintenance. The installation shall be made so that no part of the unit can be submerged.

Capacity thru Schedule 40 Pipe				
Pipe size	5 ft/sec	7.5 ft/sec	10 ft/sec	15 ft/sec
1/8"	1	1	2	3
1/4"	2	2	3	5
3/8"	3	4	6	9
1/2"	5	7	9	14
3/4"	8	12	17	25
1"	13	20	27	40
1 1/4"	23	35	47	70
1 1/2"	32	48	63	95
2"	52	78	105	167



OUTDOOR INSTALLATION



INDOOR INSTALLATION

SPECIFICATIONS

The double check type backflow preventer shall be ASSE 1015 approved, and supplied with full port ball valves. The main body and access covers shall be bronze (ASTM B 584), the seat rings and all internal polymers shall be NSF® Listed Noryl™ and the seat disc elastomers shall be silicone. The first and second checks shall be accessible for maintenance without removing the device from the line. The double check shall be a WILKINS Model 950XL.

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Model 950XL
Double Check Valve Assembly (3/4"-2")

Model 975XL
Reduced Pressure Principle Assembly (1/4"-2")

WILKINS
A ZURN COMPANY

❑ Installation ❑ Testing ❑ Maintenance Instructions

CAUTION: Installation of Backflow Preventers must be performed by qualified, licensed personnel. The installer should be sure the proper device has been selected for the particular installation. Faulty installation could result in an improperly functioning device.

WILKINS Model 975XL Reduced Pressure Principle Backflow Preventers are for use on potable water lines where a health hazard could exist if a backflow situation were to occur.

WILKINS Model 950XL Double Check Valve assemblies are for use on potable water lines where a health hazard does not exist in the event of a backflow situation.

Proper performance is dependent upon following these installation instructions and prevailing governmental and industry standards and codes. Failure to do so, according to WILKINS Limited Warranty "...releases WILKINS of any liability that it might otherwise have with respect to that device." Such failure could also result in an improperly functioning device.

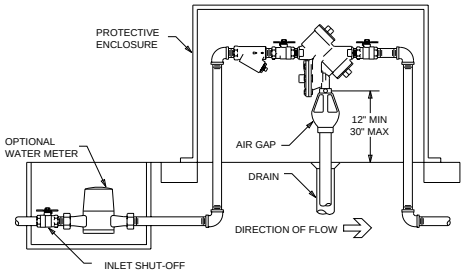
Damage to the device could result wherever water hammer and/or water thermal expansion could create excessive line pressure. Where this could occur, shock arresters and/or pressure relief valves should be installed downstream of the device.

1. Before installing either a Model 975XL or Model 950XL Backflow Preventer, flush the line thoroughly to remove all debris, chips and other foreign matter. If required, a strainer should be placed upstream of the Backflow Preventer. **CAUTION:** Do not use a strainer in seldom used emergency waterlines such as fire lines.

2. The Model 975XL must be installed in a horizontal position to provide proper operation of the relief valve.

3. Provide adequate space around the installed unit so that the test cocks will be accessible for testing and servicing.

4. If installation of a Model 975XL is in a building, provide a suitable drain arrangement to drain off spillage from the relief valve. An air gap at least two times the pipe diameter must be provided between the relief valve and the drain piping to prevent a cross-connection.



CAUTION: Do not pipe the relief valve solidly to a floor drain, sewer or sump.

5. Install valve at least 12 inches above surrounding flood level.

6. Always consult local codes for installation methods, approvals and guidance.

OUTDOOR INSTALLATION
Model 975XL and Model 950XL Backflow Preventers may be installed outdoors only if the device is protected against freezing conditions. Exposure to freezing conditions will result in improper function or damage to the device. The installation location must be kept above 32°F. All the basic installation instructions apply.

If installation is in a pit or vault, the Backflow Preventer must never be submerged in water because this could cause a cross-connection. Make sure that the pit or vault always remains dry by providing ample drainage.

INDOOR INSTALLATION
Indoor installation is preferred in areas that are subject to freezing conditions. All the basic installation instructions apply to such installations.

PARALLEL INSTALLATION
Where uninterrupted service from a single meter connection must be maintained, two or more Backflow Preventers may be connected in parallel. All the basic installation instructions apply to parallel installation. Be sure to allow adequate room between the units for testing and repair.

PLACING THE DEVICE IN SERVICE
After the installation of a Model 975XL or Model 950XL has been completed, place the unit in service as follows:

975XL REDUCED PRESSURE PRINCIPLE
1. Start with both shut-off valves closed. Slowly open the inlet shut-off valve until the backflow preventer is completely pressurized. A brief discharge from the relief valve may occur while the device is pressurizing. The discharge should cease by the time the shut-off valve is fully open. Device should function properly. If the discharge does not stop, refer to "MAINTENANCE INSTRUCTIONS" for repair procedures.

2. After the device has been pressurized, vent all trapped air from both check valve by slightly opening each of the four test cocks.

3. Slowly open the downstream shut-off valve. The Model 975XL Reduced Pressure Principle Backflow Preventer is now in service.

4. If "spitting" or intermittent discharges from the relief valve are noted, it could be a result of pressure fluctuation and/or a water hammer condition in the system. If such conditions exist, install water pressure reducing valves or water hammer shock arresters in compliance with industry standards as needed.

5. After the Model 975XL has been properly installed, test the device (see "TEST PROCEDURES"). If the device fails the test, remove the first and second check valves and thoroughly flush the device. If the relief valve fails to operate properly, inspect the sensing passage for clogging (see "MAINTENANCE INSTRUCTIONS"). Clean rubber seals of all debris and place unit back in service.

950XL DOUBLE CHECK VALVE ASSEMBLY
1. Start with both shut-off valves closed. Slowly open the inlet shut-off valve until the backflow preventer is completely pressurized.

2. When the unit has been pressurized, vent any trapped air by slightly opening each of the four test cocks.

3. Slowly open the downstream shut-off valve. The Model 950XL Double Check Valve assembly is now in service.

4. After the Model 950XL has been properly installed, test the device (see "TEST PROCEDURES"). If the device fails the test, remove the first and second check valves and thoroughly flush the device. Clean rubber seats of all debris and place unit back in service.

WARNING: This product contains lead. A chemical known to the State of California to cause cancer or birth defects or other reproductive harm. Attention plumber/installer: California law requires that this warning be given to the consumer.

Testing Procedures

MODEL 950XL DOUBLE CHECK VALVE ASSEMBLY

Equipment Required: Differential pressure gauge test kit.

950XL TEST NO. 1

Purpose:
Test #1 check valve for drip tightness against reverse flow.
Requirement:
The valve must close tight against reverse flow under all pressure differentials.
Procedure:
1. Close #2 and #1 shut-off valves.
2. Open test cocks #2 and #3.
3. Attach "VENT" hose to test cock #1, the "LOW" hose to test cock #2 and the "HIGH" hose to test cock #3.
4. Open by-pass valves "A" and "C", then open test cock #1.
5. Open test cock #4 to bleed air from valve and test kit.
6. Close by-pass valve "C". Slowly open by-pass valve "B" until differential gauge reads 5 PSID. Close by-pass valve "B".
7. The #1 check valve is considered tight if differential pressure is maintained.

MODEL 975XL REDUCED PRESSURE PRINCIPLE ASSEMBLY

Equipment Required: Differential pressure gauge test kit.

975XL TEST NO. 1

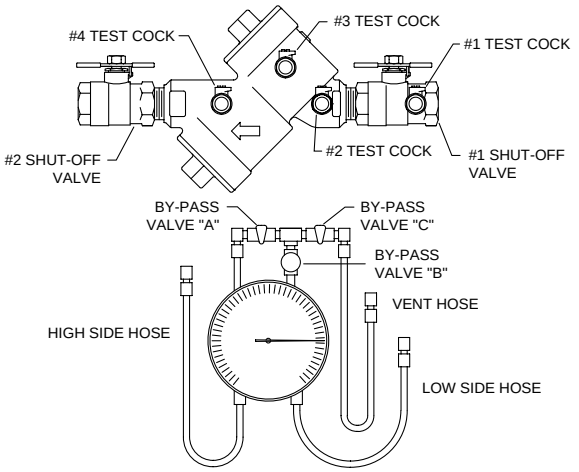
Purpose:
Test #2 check valve for tightness against reverse flow.
Requirement:
The valve must close tight against reverse flow under all pressure differentials.
Procedure:
1. Attach the "HIGH" hose to test cock #2 and the "LOW" hose to test cock #3.
2. Close #2 shut-off valve.
3. Open test cocks #2 and #3.
4. Open by-pass valves "C" and "A" and bleed to atmosphere until all air is expelled.
5. Close by-pass valve "A". Open by-pass valve "B" and bleed to atmosphere until all air is expelled. Close by-pass valves "B" and "C".
6. Attach the "VENT" hose to test cock #4.
7. Slowly open by-pass valves "A" and "C" and keep by-pass valve "B" closed.
8. Open test cock #4.
9. Indicated pressure differential will drop slightly. If pressure differential does not continue to decrease, the #2 check valve is considered tight.

975XL TEST NO. 2

Purpose:
Test #1 check valve for tightness and record pressure drop across #1 check valve.
Requirement:
The static pressure drop across the #1 check valve should be at least 3.0 PSID greater than the relief valve opening point (TEST NO. 3).
Procedure:
1. Close by-pass valve "A"
2. Close test cock #4, and disconnect "VENT" hose from test cock #4.
3. Open by-pass valves "B" and "C" bleeding to atmosphere, then close by-pass valve "B" restoring the system to normal static condition.
4. Observe the pressure differential gauge and note this as the #1 check valve psid.

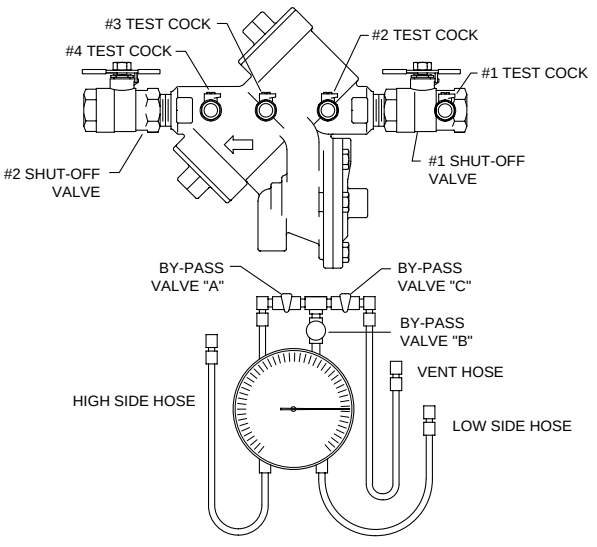
950XL TEST NO. 2

Purpose:
Test #2 check valve for tightness against reverse flow.
Requirement:
The valve must close tight against reverse flow under all pressure differentials.
Procedure:
1. Close test cock #1.
2. Attach "HIGH" hose to test cock #4 and "LOW" hose to test cock #3.
3. Open by-pass valve "C". Open test cocks #1 and #4.
4. Repeat step #6 of TEST NO. 1.
5. The #2 check valve is considered tight if differential pressure is maintained.



975XL TEST NO. 3

Purpose:
To test operation of the differential relief valve.
Requirement:
The pressure differential relief valve must operate to maintain the "ZONE" between the two check valves at least 2 PSID less than the supply pressure.
Procedure:
1. Close by-pass valve "C" and open by-pass valve "A".
2. Open by-pass valve "B" very slowly until differential gauge needle starts to drop. Hold the valve at this position and observe the gauge reading at the moment the first discharge is noted from the relief valve. Record this as the opening differential pressure of the relief valve.



Maintenance Instructions

All Model 975XL Reduced Pressure Principle and Model 950XL Double Check Valve Backflow Preventers must be inspected and maintained by licensed personnel at least once a year or more frequently as specified by local codes. Replacement of worn or damaged parts must only be made with genuine "WILKINS" parts. The WILKINS Certificate of Limited Warranty provides that failure to do so "...releases WILKINS of any liability that it might otherwise have with respect to that device." Such failure could also result in an improperly functioning device.

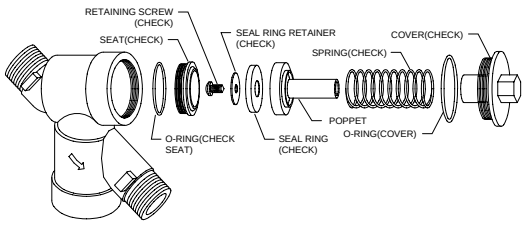
The Model 975XL Reduced Pressure Principle Assemblies should be thoroughly flushed after backflow conditions occur to prevent any type of corrosive deterioration to its components. Failure to do so could result in malfunction of the device.

GENERAL MAINTENANCE

1. Clean all parts thoroughly with water after disassembly.
2. Carefully inspect rubber seal rings, diaphragms and o-rings for damage.
3. Test unit after reassembly for proper operation(see "Testing Procedures").

SERVICING CHECK VALVES

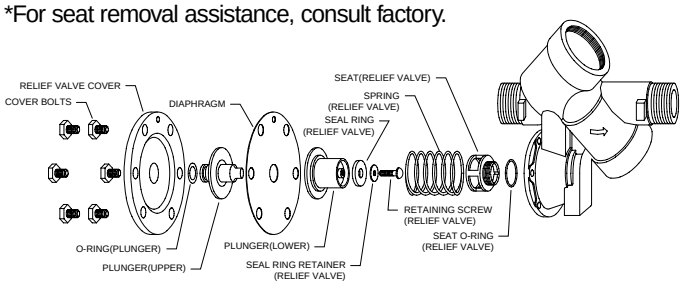
1. Close inlet and outlet shut-off valves.
2. Open No. 2, No. 3 and No. 4 test cocks to release pressure from valve.
3. Unscrew check valve covers using appropriate size wrench (CAUTION: Cover is spring loaded). To avoid injury, hold cover down firmly with one hand while unscrewing.
4. Remove check valve cover, spring and poppet assembly.
5. Inspect the rubber seal ring for cuts or embedded debris. To remove seal ring, remove screw and seal ring retainer. If the reverse side of the seal ring is unused, it is possible to invert the seal ring. This would be considered a temporary solution to fixing a fouled check and should be replaced with a new seal ring as soon as possible.
6. Inspect valve cavity and seating area. Remove any debris.
7. If installed with removable seat, unscrew seat from body and replace with new seat and lightly grease o-ring.*
8. Reverse the above procedures to reinstall check valve assembly. Care should be taken to make sure the heavy spring is installed in the No. 1 check valve (Model 975's series only). For the 3/4"-1" 975XLSE the No. 2 poppet has a cupped seal retainer. For the 1 1/4"-2" 975XLSE the No. 1 seat has a taller seat profile than the No. 2 seat.



SERVICING RELIEF VALVE

1. Remove relief valve cover bolts and cover. Gently pull on diaphragm to remove the cartridge assembly.
2. Inspect seal ring for cuts and embedded debris. Turn over or replace if required.
3. Disassemble cartridge by unscrewing relief valve retaining screw.
4. Inspect diaphragm and o-rings for damage. Replace required parts and apply a light coat of grease to plunger o-ring.
5. Carefully reassemble cartridge assembly.
6. Inspect relief valve seat for wear on seating surface. If damaged, replace seat and seat o-ring.*
7. Insert cartridge assembly into relief valve body.
8. Replace relief valve cover and cover bolts.
9. Place device in service and test per "TESTING PROCEDURES".

*For seat removal assistance, consult factory.



Troubleshooting

When the relief valve discharges intermittently it can be almost always assumed that the device is functioning correctly and that the discharge is caused by systems such as inlet pressure fluctuations or water hammer due to quick closing valves.

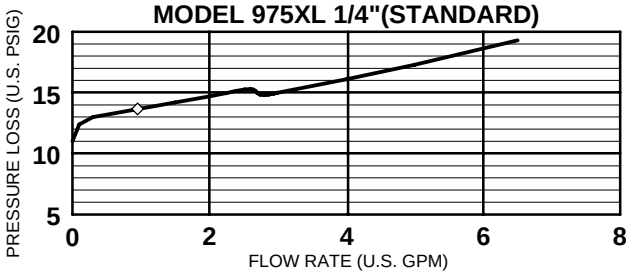
PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
1. **SUDDEN OR RAPID SPITTING**	1. Drop in inlet pressure. 2. Sudden increase in downstream pressure due to waterhamnmer from quick closing shut-off valve installed downstream.	A. Install an in-line spring loaded check valve upstream of backflow. B. Install pressure reducing valve upstream of backflow unit. C. Install in-line spring loaded check valve downstream of backflow as close to source as possible, but not closer that 4 feet.
2. **LIGHT INTERMITTENT DRIP**	1. Slightly fouled #1 check.	A. Clean #1 check and turn check valve seal ring over or replace.

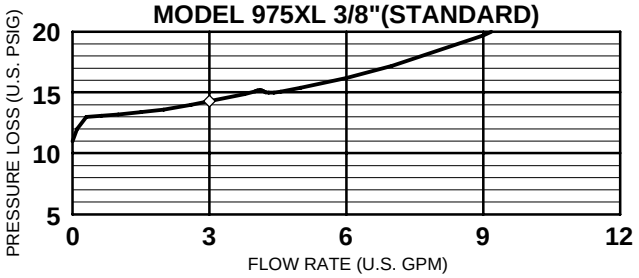
Continuous discharge of the relief valve signifies a failure of some part of the device. To help determine the specific area of failure, close the #2 shut-off valve. If the discharge stops, the #2 check requires service. If the discharge continues, the #1 check requires service.

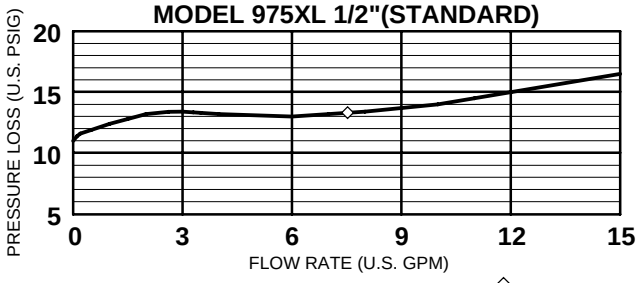
1. **CONTINUOUS DISCHARGE**	1. Fouled #1 check. 2. Fouled relief valve seat. 3. Fouled #2 check.	A. Clean check valves and turn check valve seal rings over or replace. B. Clean relief valve seat and turn relief valve seal ring over or replace.

In summation, the amount of discharge is proportional to degree of fouling. Most problems occur in the #1 check which is where debris enters the backflow preventer first.

Performance Characteristics





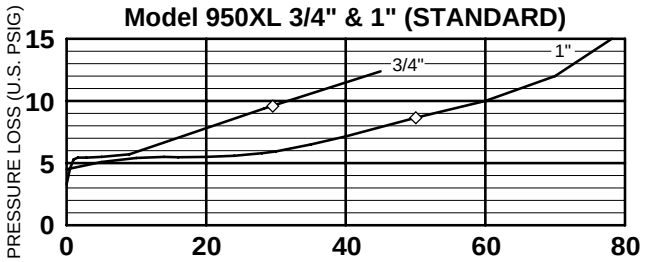


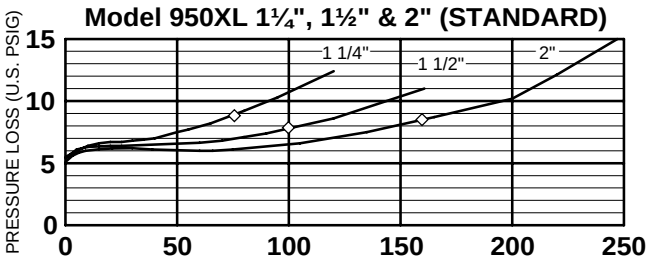
◇ Rated Flow (Established by approval agencies)

Capacity thru Schedule 40 Pipe				
Pipe size	5 ft/sec	7.5 ft/sec	10 ft/sec	15 ft/sec
1/8"	1	1	2	3
1/4"	2	2	3	5
3/8"	3	4	6	9
1/2"	5	7	9	14
3/4"	8	12	17	25
1"	13	20	27	40
1 1/4"	23	35	47	70
1 1/2"	32	48	63	95
2"	52	78	45	167

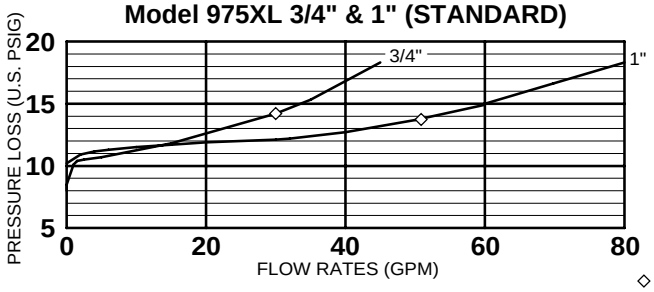
SPECIFICATIONS

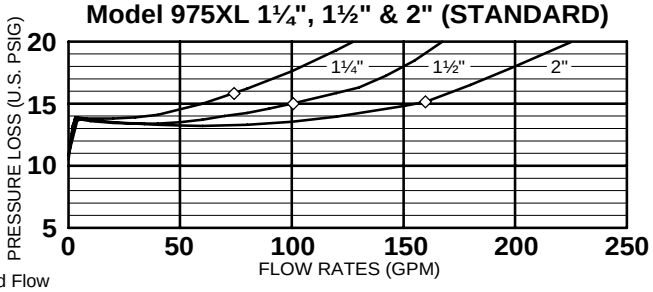
Maximum working water pressure	175 PSI
Maximum working water temperature	180°F
Hydrostatic test pressure	350 PSI
End connections	Threaded NPT ANSI B1.20.1





◇ Rated Flow (Established by approval agencies)





◇ Rated Flow
(Established by approval agencies)

Proper performance is dependent upon licensed, qualified personnel performing regular, periodic testing according to WILKINS' specifications and prevailing governmental & industry standards and codes and upon following these installation instructions. Failure to do so releases WILKINS of any liability that it might otherwise have with respect to that device. Such failure could also result in an improperly functioning device.

WILKINS
A ZURN COMPANY

WILKINS OPERATION OF ZURN PLUMBING PRODUCTS
1747 Commerce Way, Paso Robles, CA 93446 Phone:805/238-7100 Fax:805/238-5766

TECH SPECS

ESP-MC Series Controllers

Maxicom²™ Compatible

The power of an advanced water-management tool in an easy-to-use package. The ESP-MC is a commercial-duty controller for the basic or sophisticated user. Four programs, a real-time calendar, Rain Bird's exclusive Cycle+Soak™ water management software, and the best customer satisfaction program in the industry, helping you conserve both water and money.

Features

- 12-hour watering duration for any or all stations to aid in drip compatibility
- Four independent programs with eight start times each allow mixed irrigation applications in a single controller
- Two master valve terminals, one programmable by station, to provide better irrigation control
- Programs can overlap to maximize hydraulic efficiency and minimize watering time
- 365-day calendar with leap year intelligence for one-time date and time setting
- Event day off
- Programmable rain delay enables system to stay off for up to 99 days with auto-restart
- Upgradeable to Maxicom² satellite
- Independent day cycle by program
- Water budget by program provides adjustments from 0-300% in 1% increments
- Cycle+Soak by station allows total irrigation run time to be split into usable cycles, minimizing runoff
- Cycle & Clean™ - Apply the ESP-MC's Cycle+Soak and Program Overlap features for automatic flushing of Rain Bird's Automatic Filter Kit
- Programmable delay between stations provides time for water well recovery or slow closing valves
- Manual watering by station or program
- Sensor override switch with LED to indicate when irrigation is suspended
- Non-volatile, 100-year memory holds program, date, and time during power outages
- Diagnostic circuit breaker identifies electrical shorts, skips shorted station, and continues watering remaining program
- Quick connect terminal strip for fast installation
- Universal remote ready — pre-installed connectors for addition of remote products
- Heavy-duty transformer for simultaneous operation of up to nine 24 VAC, 7VA solenoids
- Battery-programmable controller allows for programming prior to installation
- Available in 3 enclosures:
  - Powder coated wall-mount steel cabinet
  - NEMA 4 rated wall-mount plastic cabinet
  - Stainless Steel Pedestal

Operating Specifications

- Station timing: A, B, C, D - 0 to 2 hours in 1-minute increments; - 2 to 12 hours in 10-minute increments
- Automatic starts: 32 starts total, eight per program per day
- Programming schedule: 1. ODD day watering, 2. EVEN day watering, 3. Variable day cycle from 1 to 99 days by program, 4. Custom day-of-the-week by program
- Test program: Variable 1 to 99 minutes
- Rain Shutdown: programmable 1 to 99 days

Electrical Specifications

- Input required: 117 VAC ± 10%, 60 Hz (International models: 220 VAC, 50 Hz)
- Output 26.5 VAC, 3A
- Station load capacity: Up to two 24 VAC, 7VA solenoid valves per station plus a master valve or pump start relay
- Diagnostic circuit breaker skips and indicates stations with overloaded circuits
- Power supply overload, backup fuse: 3A
- Battery backup: 9VDC, NiCad rechargeable for programming under battery power and for maintaining active program-in-progress during a power outage
- Heavy-duty electrical surge protection for input and output

Dimensions

- Steel Wall-mount
  - Width: 11 5/16" (28,7 cm)
  - Height: 11½" (29,2 cm)
  - Depth: 6½" (16,5 cm)
- Plastic Wall-mount
  - Width: 15¾" (40,0 cm)
  - Height: 11 1/2" (44,5 cm)
  - Depth: 8 1/2" (20,6 cm)

- Stainless Steel Pedestal
  - Width: 11½" (29,2 cm)
  - Height: 30" (76,2 cm)
  - Depth: 11½" (29,2 cm)

Optional Features

- Pedestal Mount (PED-DD16)
- Automatic Rain Shutoff (Rain Check™)

How to Specify

ESP-24MC-SS

Model
ESP

Mounting
Blank: Steel Cabinet
SS: Stainless Steel Pedestal
P: Plastic Cabinet

Number of Stations
-8MC: 8 stations
-12MC: 12 stations
-16MC: 16 stations
-24MC: 24 stations
-32MC: 32 stations
-40MC: 40 stations