RAIN®

2012
PRODUCT GUIDE

CONTENTS

ROTORS

SPECIALTY PRODUCTS

www.krain.com

PROFESSIONALS RELY ON K-RAIN IN OVER 63 COUNTRIES.

Shouldn't you?

K-Rain® is one of the world's foremost manufacturers of gear-driven rotors, sprinklers, sprays, controllers and valves for the commercial and residential irrigation markets. With more than 90 patents and over 30 years of industry experience, our advanced design and engineering have made K-Rain products the easiest to install, set and use.

K-Rain has been exceeding expectations in the harshest proving ground, the field, for over 30 years. The natural setting of the real world is the perfect testing facility for our industry leading irrigation products. We didn't read the book on turf irrigation, we wrote it.

K-Rain began with a vision. Beginning with design of an automatic irrigation control system for his home, K-Rain founder Carl Kah currently holds over 90 patents specific to the industry. This was the foundation of K-Rain – our history. Today over 300 men and woman make up the K-Rain team, serving customers in the United States and across the globe.

Beyond any technical advancement, these people are at the heart of all we do. We are proud to say ***"We love what we do. Everyday we go to work with one thought: Make it better."***

– **Carl Kah**, Founder

MODELS

13003	Mini*Pro* - 4"
13006	Mini*Pro* - 6"
13012	Mini*Pro* - 12"

OTHER OPTIONS: ADD TO PART NUMBER

-CV	Check Valve
-NN	No Nozzle
-RCW	Reclaimed Water Use

MINI*PRO*™ 13003

Perfect for small lawn and landscape areas and for replacing fixed sprays.

When considering the industry leading MINI*PRO*™ gear driven rotor, think water efficiency. Now available in three popular heights and compatible with a wide selection of nozzles, the MINI*PRO*™ brings flexibility to system design.

FEATURES/BENEFITS

- Revolutionary Patented Easy Arc Set–Simplified arc set allows for wet or dry adjustment in seconds.
- 1/2" Inlet–Replaces all standard mini rotors and pop-up sprays.
- Adjustable to 360°–Provides a full range of adjustment from 40° to 360°
- Patented Arc Set Degree Markings–Clearly indicates the current watering pattern and simplifies arc set adjustment.
- Time Proven Patented Reversing Mechanism–Assures continuous reverse and return…over a 20 year history.
- Ratcheting Riser–Allows for easy adjustment of your left starting position with a simple turn of the riser.
- Rubber Cover–Seals out dirt and increases product durability.
- Wide Selection of Nozzles–Provides flexibility in system design.
- Optional Check Valve–Prevents low head drainage.
- Five Year Limited Warranty.

HOW TO SPECIFY

13003 **RCW**

Model Number — Description

EASY ARC SETTING

- Arc Selection 40° to 360°

Adjust From Left Start

MINIPRO ▪ PERFORMANCE DATA

PERFORMANCE

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#0.75	30	17'	.75
	40	17'	.8
	50	18'	.9
#1	30	20'	.9
	40	21'	1.2
	50	21'	1.3
#1.5 PRE-INSTALLED	30	23'	1.4
	40	24'	1.7
	50	24'	1.9
#2	30	25'	1.8
	40	27'	2.1
	50	27'	2.4
#3	30	28'	2.7
	40	30'	3.0
	50	30'	3.3

METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M^3/H
#0.75	207	2.1	5.1	2.84	.2
	276	2.8	5.1	3.03	.2
	345	3.4	5.4	3.41	.2
#1	207	2.1	6.0	3.41	.2
	276	2.8	6.3	4.54	.3
	345	3.4	6.3	4.92	.3
#1.5 PRE-INSTALLED	207	2.1	6.9	5.30	.4
	276	2.8	7.2	6.44	.4
	345	3.4	7.2	7.20	.5
#2	207	2.1	7.5	6.82	.5
	276	2.8	8.1	7.95	.5
	345	3.4	8.1	9.09	.6
#3	207	2.1	8.4	10.2	.7
	276	2.8	9.0	11.4	.8
	344	3.4	9.0	12.5	.8

Data represents test results in zero wind. Adjust for local conditions. Radius may be reduced with nozzle retention screw.

SPECIFICATIONS

- Inlet: 1/2" Threaded NPT
- Arc Adjustment Range: 40° to 360°
- Flow Range: .75-3.3 GPM
- Pressure Rating: 20-70 PSI
- Precipitation Rate: .22 to .41 Inches Per Hour (Depending on Spacing and Nozzle Used)
- Overall Height (Popped Down): 6"
- Recommended Spacing: 17' to 28'
- Radius: 17' to 30'
- Nozzle Trajectory: 26°
- Riser Height: 4", 6" or 12"

FACT

K-RAIN pioneered the flat blade screw driver method of rotor adjustment in 1989.

K-RAIN MINIPRO™ MODEL 13003

The MiniPro is a gear-driven, rotary type sprinkler, capable of covering an area of 17' to 30' (5.2 to 9.1 M) radius at nozzle pressure of 30 to 50 PSI (2.1 to 3.4 bar) with a discharge rate of .75 to 3.3 GPM (2.84 to 12.5 LPM). The MiniPro is supplied with five (5) numerically coded interchangeable nozzles. Sprinkler nozzle trajectory is 26°. The sprinkler has a stainless steel radius adjustment screw.

The MiniPro provides arc adjustment from 40° to 360°. Sprinkler arc setting adjustment is carried out by rotation of a flat blade screwdriver within top cover adjustment slot. Sprinkler coverage pattern is indicated by degree graduations and an arrow located on top of the sprinkler. The MiniPro is adjustable in all phases of installation (i.e., before installation, after installation while static, and after installation while in operation).

MODELS

RPS50	RPS 50 Rotor

OTHER OPTIONS: ADD TO PART NUMBER

-CV	Check Valve
-NN	No Nozzle
-RCW	Reclaimed Water Use

RPS50™

The RPS 50 gear drive is designed for smaller areas and is available with a wide selection of nozzles that bring flexibility to system design.

FEATURES/BENEFITS

- Right position start – rotor rotates counterclockwise from fixed right start position.
- Time proven patented reversing mechanism – Assures continuous reverse and return…over a 20 year history.
- Ratcheting riser – allows for easy adjustment of your right starting position with a simple turn of the riser.
- Rubber cover – seals out dirt and increases product durability.
- Wide selction of nozzles – provides flexibility in system design.
- Optional check valve – prevents low head drainage.
- Five year limited warranty

HOW TO SPECIFY

RPS50 ***RCW***

Model Number — Description

EASY ARC SETTING

- Arc Selection 40° to 360°

Adjust From Right Start

RPS50 ▪ PERFORMANCE DATA

PERFORMANCE

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#0.75	30	17′	.75
	40	17′	.8
	50	18′	.9
#1	30	20′	.9
	40	21′	1.2
	50	21′	1.3
#1.5 PRE-INSTALLED	30	23′	1.4
	40	24′	1.7
	50	24′	1.9
#2	30	25′	1.8
	40	27′	2.1
	50	27′	2.4
#3	30	28′	2.7
	40	30′	3.0
	50	30′	3.3

METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M^3/H
#0.75	207	2.1	5.1	2.84	.2
	276	2.8	5.1	3.03	.2
	345	3.4	5.4	3.41	.2
#1	207	2.1	6.0	3.41	.2
	276	2.8	6.3	4.54	.3
	345	3.4	6.3	4.92	.3
#1.5 PRE-INSTALLED	207	2.1	6.9	5.30	.4
	276	2.8	7.2	6.44	.4
	345	3.4	7.2	7.20	.5
#2	207	2.1	7.5	6.82	.5
	276	2.8	8.1	7.95	.5
	345	3.4	8.1	9.09	.6
#3	207	2.1	8.4	10.2	.7
	276	2.8	9.0	11.4	.8
	344	3.4	9.0	12.5	.8

Data represents test results in zero wind. Adjust for local conditions. Radius may be reduced with nozzle retention screw.

SPECIFICATIONS

- Inlet: 1/2 " Threaded NPT
- Arc adjustment range: 40 to 360
- Flow range: .75 – 3.3 GPM
- Pressure Rating: 20-70 psi
- Precipitation Rate: .22 to .41 inches per hour (depending on space and nozzle used)
- Overall height (popped down): 6"
- Recommended spacing: 17′ to 28′
- Radius: 17′ to 30′
- Nozzle trajectory: 26°
- Riser height: 4"

K-RAIN RPS50™

The RPS50 is a gear-driven, rotary type sprinkler, capable of covering an area of 17' to 30' (5.2 to 9.1 M) radius at nozzle pressure of 30 to 50 PSI (2.1 to 3.4 bar) with a discharge rate of .75 to 3.3 GPM (2.84 to 12.5 LPM). The RPS50 is supplied with five (5) numerically coded interchangeable nozzles. Sprinkler nozzle trajectory is 26°. The sprinkler has a stainless steel radius adjustment screw and has arc adjustment from 40° to 360°.

MODELS

RPS75	RPS 75 Rotor

OTHER OPTIONS: ADD TO PART NUMBER

-CV	Check Valve
-NN	No Nozzle
-RCW	Reclaimed Water Use

RPS75™

The RPS75™ gear drive is designed for basic residential and light commercial applications and is a direct replacement for Hunter® PGP® rotors. The reversing mechanism, a K-Rain patented feature, is the same mechanism used in the Hunter® PGP® (K-Rain currently licenses this patent to Hunter®). With K-Rain's wide selection of standard and low angle nozzles, the RPS75 provides even water distribution.

FEATURES/BENEFITS

- Direct replacement for Hunter® PGP®.
- Right Position Start–Rotor rotates counterclockwise from fixed right start position.
- Riser fits in existing Hunter® PGP® cans–simply unscrew the existing riser from the PGP® can and replace with the RPS75 riser.
- Top adjustment–no training necessary, the RPS75 has the same adjustment procedure as the Hunter® PGP®.
- Full and Part circle rotation–provides a full range of adjustment from 40° to 360°.
- Non-flushing wiper seal–reduces leaks caused by debris trapped under seal.
- 3/4" Inlet–Replaces all standard rotors.
- Ideal for low flow applications.
- Universal adjustment tool–compatible with existing Hunter® products.
- Rubber Cover–Seals out dirt and increases product durability.
- Wide Selection of Nozzles–Including standard and low angle, provides flexibility in system design.
- Five Year Limited Warranty.

SPECIFICATIONS

- Inlet: 3/4" Threaded NPT
- Arc Adjustment Range: 40° to 360°
- Flow Range: .75 – 8.2 GPM
- Pressure Rating: 30 – 70 PSI
- Precipitation Rate: .12 to 1.16 Inches Per Hour
- Overall Height (Popped Down): 7 3/8"
- Recommended Spacing: 25' to 45'
- Radius: 22' to 51'
- Nozzle Trajectory: 25°
- Low Angle Nozzle Trajectory: 11°
- 8 Standard and 4 Low Angle Nozzles Included
- Riser Height: 4"

HOW TO SPECIFY

RPS75 ***-RCW***

Model Number — Description

EASY ARC SETTING

- Arc Selection 40° to 360°

Adjust From Right Start

RPS75 ▪ PERFORMANCE DATA

PERFORMANCE

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#0.75	30	29′	.7
	40	30′	.8
	50	30′	.9
	60	31′	1.0
#1	30	30′	0.9
	40	31′	1.0
	50	31′	1.2
	60	32′	1.3
#1.5	30	32′	1.2
	40	33′	1.4
	50	34′	1.6
	60	34′	1.8
#2	30	34′	1.6
	40	36′	1.8
	50	38′	2.0
	60	38′	2.2
#3 PRE-INSTALLED	30	36′	2.0
	40	38′	2.4
	50	40′	2.7
	60	40′	2.9
#4	30	36′	2.6
	40	40′	3.0
	50	42′	3.4
	60	42′	3.7
#6	40	38′	4.2
	50	43′	4.9
	60	46′	5.5
	70	47′	6.0
#8	40	45′	6.0
	50	48′	6.8
	60	49′	7.6
	70	51′	8.2

METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M³/H
#0.75	206	2.1	8.8	2.6	.16
	275	2.8	9.1	3.0	.18
	344	3.4	9.1	3.4	.20
	413	4.1	9.4	3.8	.23
#1	206	2.1	9.1	3.4	.20
	275	2.8	9.4	3.8	.23
	344	3.4	9.4	4.5	.27
	413	4.1	9.8	4.9	.30
#1.5	206	2.1	9.8	4.5	.27
	275	2.8	10.1	5.3	.32
	344	3.4	10.4	6.1	.36
	413	4.1	10.4	6.8	.41
#2	206	2.1	10.4	6.1	.36
	275	2.8	11.0	6.8	.41
	344	3.4	11.6	7.6	.45
	413	4.1	11.6	8.3	.50
#3 PRE-INSTALLED	206	2.1	11.0	7.6	.45
	275	2.8	11.6	9.1	.55
	344	3.4	12.2	10.2	.61
	413	4.1	12.2	11.0	.66
#4	206	2.1	11.0	9.8	.59
	275	2.8	12.2	11.4	.68
	344	3.4	12.8	12.9	.77
	413	4.1	12.8	14.0	.84
#6	206	2.1	11.6	15.9	.91
	275	2.8	13.1	18.5	1.11
	344	3.4	14.0	20.8	1.25
	413	4.1	14.3	22.7	1.36
#8	275	2.8	13.7	22.7	1.36
	344	3.4	14.6	25.7	1.54
	413	4.1	14.9	28.8	1.73
	482	4.8	15.5	31.0	1.86

LOW ANGLE DATA

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#1	30	22′	1.2
	40	24′	1.7
	50	26′	1.8
	60	28′	2.0
#3	30	29′	3.0
	40	32′	3.1
	50	35′	3.5
	60	37′	3.8
#4	30	31′	3.4
	40	34′	3.9
	50	37′	4.4
	60	38′	4.7
#6	40	38′	6.5
	50	40′	7.3
	60	42′	8.0
	70	44′	8.6

METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M³/H
#1	207	2.0	6.7	4.5	.34
	275	3.0	7.3	6.4	.39
	344	3.5	7.9	6.8	.41
	413	4.0	8.5	7.6	.46
#3	207	2.0	8.8	11.4	.68
	275	3.0	9.8	11.7	.71
	344	3.5	10.7	13.2	.80
	413	4.0	11.3	14.4	.87
#4	207	2.0	9.4	12.9	.78
	275	3.0	10.4	14.8	.89
	344	3.5	11.3	16.7	1.00
	413	4.0	11.6	17.8	1.07
#6	275	3.0	11.6	24.6	1.68
	344	3.5	12.2	27.6	1.66
	413	4.0	12.8	30.3	1.82
	482	5.0	13.4	32.6	1.96

Data represents test results in zero wind. Adjust for local conditions. Radius may be reduced with nozzle retention screw.

MODELS

11003	Pro*Plus*
11003-HP	Pro*Plus* 12" High Pop
11003-SH	Pro*Plus* Shrub Head

OTHER OPTIONS: ADD TO PART NUMBER

-CV	Check Valve
-LA	Low Angle Nozzle
-NN	No Nozzle
-RCW	Pro*Plus* for Reclaimed Water w/Low Angle Nozzle

PRO*PLUS*™ 11003

The PRO*PLUS*™ adjustable arc and full-circle gear driven rotor comes standard with nine numerically coded interchangeable nozzles. The flagship model in the PRO*PLUS*™ line, it's packed with features that ensure reliability, saving the installer time, money and needless frustration. Excellent nozzle performance delivers an exceptional fall out pattern. In independent testing by C.I.T., the PRO*PLUS*™ delivered up to 90% uniform coverage.

Tough, proven and advanced, the PRO*PLUS*™ is the leader in it's class. *Set it and forget it.* Arc Memory Clutch returns the rotor to its preset position. Technology works for you.

FEATURES/BENEFITS

- Revolutionary Patented Easy Arc Set–Simplified arc set allows for wet or dry adjustment in seconds.
- 5" Riser–Perfect for grasses with thick thatch.
- 3/4" Inlet–Replaces all standard rotors.
- 2N1 Adjustable or Continuous Rotation–Provides a full range of adjustment from 40° to a continuous full circle.
- Patented Arc Set Degree Markings–Clearly indicates the current watering pattern and simplifies arc set adjustment.
- Arc Memory Clutch–Prevents internal gear damage and returns rotor to its prior setting automatically if nozzle turret is forced past its stop.
- Time Proven Patented Reversing Mechanism–Assures continuous reverse and return…over a 20 year history.
- Ratcheting Riser–Allows for easy adjustment of your left starting position with a simple turn of the riser.
- Rubber Cover–Seals out dirt and increases product durability.
- Wide Selection of Nozzles–Including standard and low angle, provides flexibility in system design.
- Optional Check Valve–Prevents low head drainage.
- Five Year Limited Warranty.

HOW TO SPECIFY

11003 ***-RCW***

Model Number — Description

EASY ARC SETTING

- Arc Selection 40° to Continuous 360°
  Adjust From Left Start

EMERALD BAY RESORT
Exuma Island, Bahamas

Over 2000 acres of tropical landscaping, groomed lawns and golf courses surround this first class resort. K-Rain products were used exclusively in all areas.

SOUTHEASTERN IRRIGATION/BERMUDA LANDSCAPE COMPANIES OF LAKE WORTH, FLORIDA INSTALLED THE THE LANDSCAPING AND IRRIGATION SYSTEM.

PRO*PLUS*™ FOR RECLAIMED WATER–11003-RCW

A heavy duty rubber cover protects against physical injury. The purple cover positively identifies reclaimed water use and reduces your liability.

FOR MORE INFORMATION ON RCW PRODUCTS, PLEASE SEE PAGES 36 AND 37.

PRO*PLUS*™ 12" HIGH POP–11003-HP

Appropriate for medium-to-large landscape areas, the PRO*PLUS*™ HP provides high-level-accuracy in a riser that pops up over your plant material.

As with all the members of the PRO*PLUS*™ family, the High Pop provides the patented Arc Set, with the arc of rotation clearly indicated at the top. Fully adjustable from 40° to continuous 360° degrees, the system is adjustable prior to installation and during operation.

A ratcheting riser allows easy adjustment of the left start position.

PRO*PLUS*™ SHRUB HEAD–11003-SH

All the features of the PRO*PLUS* in a shrub head model.

Big things come in small packages. That's the scoop on the PRO*PLUS*™ Shrub Head. This rotor is packed with versatility, reliability and proven excellence.

The PRO*PLUS*™ Shrub Head incorporates 2N1 adjustable or continuous rotation. This innovative component in rotor design provides a full range of adjustment from 40° to continuous 360°, reducing inventory and streamlining contractors' back-office operation.

PRO*PLUS* ▪ PERFORMANCE DATA

PERFORMANCE

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#0.5	30	28′	.5
	40	29′	.6
	50	29′	.7
	60	30′	.8
#0.75	30	29′	.7
	40	30′	.8
	50	31′	.9
	60	32′	1.0
#1	30	32′	1.3
	40	33′	1.5
	50	34′	1.6
	60	35′	1.8
#2	30	37′	2.4
	40	40′	2.5
	50	42′	3.0
	60	43′	3.3
#2.5 PRE-INSTALLED	30	38′	2.5
	40	39′	2.8
	50	40′	3.2
	60	41′	3.5
#3	30	38′	3.6
	40	39′	4.2
	50	41′	4.6
	60	42′	5.0
#4	30	43′	4.4
	40	44′	5.1
	50	46′	5.6
	60	49′	5.9
#6	40	45′	5.9
	50	46′	6.0
	60	48′	6.3
	70	49′	6.7
#8	40	42′	8.0
	50	45′	8.5
	60	49′	9.5
	70	50′	10.0

METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M³/H
#0.5	206	2.0	8.5	1.89	.11
	275	3.0	8.8	2.27	.14
	345	3.5	8.8	2.65	.16
	413	4.0	9.1	3.03	.18
#0.75	206	2.0	8.8	2.65	.16
	275	3.0	9.1	3.03	.18
	345	3.5	9.4	3.41	.20
	413	4.0	9.8	3.79	.23
#1	206	2.0	9.8	4.92	.30
	275	3.0	10.1	5.68	.34
	345	3.5	10.4	6.05	.36
	413	4.0	10.7	6.81	.41
#2	206	2.0	11.3	9.08	.54
	275	3.0	12.2	9.46	.56
	345	3.5	12.8	11.35	.68
	413	4.0	13.1	12.49	.75
#2.5 PRE-INSTALLED	206	2.04	11.6	9.46	.57
	275	2.72	11.9	10.60	.64
	345	3.40	12.2	12.11	.73
	413	4.08	12.5	13.25	.79
#3	206	2.0	11.6	13.63	.81
	275	3.0	11.9	15.89	.95
	345	3.5	12.5	17.41	1.04
	413	4.0	12.8	18.92	1.13
#4	206	2.0	13.1	16.65	.99
	275	3.0	13.4	19.30	1.15
	345	3.5	14.0	21.19	1.27
	413	4.0	14.9	22.33	1.33
#6	206	3.0	13.7	22.33	1.33
	275	3.5	14.0	22.71	1.36
	345	4.0	14.6	23.85	1.43
	413	5.0	14.9	25.35	1.52
#8	206	3.0	12.8	30.28	1.81
	275	3.5	13.7	32.12	1.92
	345	4.0	14.8	35.95	2.15
	413	5.0	15.3	37.85	2.27

LOW ANGLE DATA

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#1	30	22′	1.2
	40	24′	1.7
	50	26′	1.8
	60	28′	2.0
#3	30	29′	3.0
	40	32′	3.1
	50	35′	3.5
	60	37′	3.8
#4	30	31′	3.4
	40	34′	3.9
	50	37′	4.4
	60	38′	4.7
#6	40	38′	6.5
	50	40′	7.3
	60	42′	8.0
	70	44′	8.6

METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M³/H
#1	207	2.04	6.71	4.54	.27
	275	2.72	7.32	6.43	.39
	344	3.40	7.92	6.80	.41
	413	4.08	8.53	7.56	.46
#3	207	2.04	8.84	11.34	.68
	275	2.72	9.75	11.72	.71
	344	3.40	10.67	13.23	.80
	413	4.08	11.58	14.36	.87
#4	207	2.04	9.45	12.85	.78
	275	2.72	10.36	14.74	.89
	344	3.40	11.28	16.63	1.00
	413	4.08	11.58	17.77	1.07
#6	275	2.72	11.58	24.57	1.48
	344	3.40	12.19	27.59	1.76
	413	4.08	12.80	30.24	1.82
	482	4.76	13.41	32.51	1.96

Data represents test results in zero wind. Adjust for local conditions. Radius may be reduced with nozzle retention screw.

SPECIFICATIONS

- Inlet: 3/4" Threaded NPT
- Arc Adjustment Range: 40° to Continuous 360°
- Flow Range: .5 - 10.0 GPM
- Pressure Rating: 20 - 70 PSI
- Precipitation Rate: .06 to .50 Inches Per Hour (Depending on Spacing and Nozzle Used)
- Overall Height (Popped Down): 7 1/2" / 17" for High Pop
- Recommended Spacing: 28' to 44'
- Radius: 22' to 50'
- Nozzle Trajectory: 26°
- Low Angle Nozzle Trajectory: 12°
- Standard and Low Angle Nozzle: Included
- Riser Height: 5"

FACT

K-RAIN founder Carl Kah, holds over 90 patents specific to the irrigation industry. Notable patents include the reversing mechanism and K-RAIN's arc set indicator.

K-RAIN PRO*PLUS*™ MODEL 11003

The ProPlus is a gear-driven, rotary type sprinkler, capable of covering an area of 22' to 50' (6.7 to 15.3 M) radius at nozzle pressure of 30 to 70 PSI (2.0 to 5.0 bar) with a discharge rate of .5 to 10.0 GPM (1.89 to 37.85 LPM). The ProPlus is supplied with nine (9) numerically coded interchangeable nozzles. Sprinkler nozzle trajectory is 26°. The ProPlus is supplied with four (4) numerically coded interchangeable low angle nozzles. Low angle nozzle trajectory is 12°. The sprinkler has a stainless steel radius adjustment screw.

The ProPlus provides both part and full circle adjustment from 40° to 360°. Sprinkler coverage pattern is indicated by degree graduations and an arrow located on top of the sprinkler, which rotates to correspond with arc selected. True full circle operation by continuous forward rotation is achieved by alignment of the indication arrow with the "360°" position locator marked on the top cover. The sprinkler has a friction-clutch mechanism to allow for 360°+ forward or reverse movement of nozzle turret without damage to the internal gear components. The ProPlus incorporates an "arc memory clutch" feature to allow original arc pattern to be automatically resumed following disturbance of nozzle turret setting. The sprinkler has a minimum of 5-inch (12.7 cm) pop-up stroke and a 3/4-inch female thread inlet.

MODELS

10003	Super*Pro*
10003-HP	Super*Pro* 12" High Pop
10003-SH	Super*Pro* Shrub Head

OTHER OPTIONS: ADD TO PART NUMBER

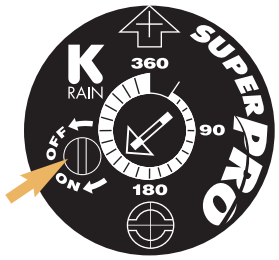
-CV	Check Valve
-NN	No Nozzle
-RCW	Reclaimed Water Use

SUPER*PRO*™ 10003

The SUPER*PRO*™ Rotor with its patented flow control allows you to reduce the distance and flow rate proportionately for even water fall out and better zone performance. When turned off completely the riser stays popped up for quick nozzle changes or adjustments.

Like all K-Rain rotors, the SUPER*PRO*™ is packed with innovative features: Partial to continuous 360° coverage, an interchangeable nozzle for superior spray patterns, patented Easy Arc Set and Arc Memory Clutch, which returns the rotor to its preset position automatically.

INNOVATIVE FLOW CONTROL



- Reduces distance & flow rate proportionately
- Provides full On/Off control

Scan the code with your smart phone & watch the video.

FEATURES/BENEFITS

- Patented Flow Shut-Off – Adjust distance and water flow at the same time. Allows individual heads to be turned off during installation or adjustment–perfect for quick nozzle changes.
- 5" Riser–Perfect for grasses with thick thatch.
- 3/4" Inlet–Replaces all standard rotors.
- Revolutionary Patented Easy Arc Set–Simplified arc set allows for wet or dry adjustment in seconds.
- 2N1 Adjustable or Continuous Rotation–Provides a full range of adjustment from 40° to a continuous full circle.
- Patented Arc Set Degree Markings–Clearly indicates the current watering pattern and simplifies arc set adjustment.
- Arc Memory Clutch–Prevents internal gear damage and returns rotor to its prior setting automatically if nozzle turret is forced past its stop.
- Time Proven Patented Reversing Mechanism–Assures continuous reverse and return…over a 20 year history.
- Ratcheting Riser–Allows for easy adjustment of your left starting position with a simple turn of the riser.
- Rubber Cover–Seals out dirt and increases product durability.
- Wide Selection of Nozzles–Including standard and low angle, provides flexibility in system design.
- Optional Check Valve–Prevents low head drainage.
- Five Year Limited Warranty.

HOW TO SPECIFY

10003 ***-RCW***

Model Number — Description

EASY ARC SETTING

- Arc Selection 40° to Continuous 360°
  Adjust From Left Start

SPECIFICATIONS

- Inlet: 3/4" Threaded NPT
- Arc Adjustment Range: 40° to Continuous 360°
- Flow Range: .5 - 10.0 GPM
- Pressure Rating: 20 - 70 PSI
- Precipitation Rate: .05 to .74 Inches Per Hour (Depending on Spacing and Nozzle Used)
- Overall Height (Popped Down): 7 1/2"
- Recommended Spacing: 28' to 44'
- Radius: 26' to 49'
- Nozzle Trajectory: 26°
- Low Angle Nozzle Trajectory: 12°
- Standard and Low Angle Nozzle: Included
- Riser Height: 5"

FACT

K-RAIN'S exclusive patented top arc indication makes their rotors the easiest in the world to adjust.

K-RAIN SUPER*PRO*™ MODEL 10003

The SuperPro is a gear-driven, rotary type sprinkler, capable of covering an area of 26' to 49' (7.9 to 14.9 M) radius at nozzle pressure of 30 to 70 PSI (2.1 to 4.8 bar) with a discharge rate of .5 to 10.0 GPM (1.89 to 35.96 LPM). The SuperPro has a manual flow shut-off (patent pending). The sprinkler is supplied with nine (9) numerically coded interchangeable nozzles. Sprinkler nozzle trajectory is 26°. The SuperPro is supplied with four (4) numerically coded interchangeable low angle nozzles. Low angle nozzle trajectory is 12°. The SuperPro has a stainless steel radius adjustment screw.

The SuperPro provides both part and full circle adjustment from 40° to continuous 360°. Sprinkler coverage pattern is indicated by degree graduations and an arrow located on top of the sprinkler, which rotates to correspond with arc selected. True full circle operation by continuous forward rotation is achieved by alignment of the indication arrow with the "360°" position locator marked on the top cover. The sprinkler has a friction-clutch mechanism to allow for 360°+ forward or reverse movement of nozzle turret without damage to the internal gear components. The SuperPro incorporates an "arc memory clutch" feature to allow original arc pattern to be automatically resumed following disturbance of nozzle turret setting.

The SUPER*PRO* has a minimum of 5-inch (12.7 cm) pop-up stroke and a 3/4-inch female thread inlet.

SUPER*PRO* ▪ PERFORMANCE DATA

PERFORMANCE

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#0.5	30	30'	.45
	40	29'	.5
	50	26'	.6
	60	26'	.7
#0.75	30	32'	.7
	40	32'	.8
	50	33'	.9
	60	33'	1.0
#1	30	30'	1.1
	40	32'	1.3
	50	33'	1.5
	60	33'	1.6
#2	30	38'	2.3
	40	38'	2.5
	50	40'	2.7
	60	42'	3.0
#2.5 PRE-INSTALLED	30	35'	2.5
	40	36'	2.8
	50	37'	3.2
	60	38'	3.6
#3	30	35'	3.4
	40	36'	3.8
	50	38'	4.2
	60	39'	4.8
#4	30	42'	4.1
	40	44'	4.6
	50	45'	5.1
	60	46'	5.7
#6	40	46'	5.8
	50	48'	6.4
	60	49'	7.0
	70	49	7.5
#8	40	42'	7.5
	50	45'	8.2
	60	48'	9.0
	70	48	9.5

METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M^3/H
#0.5	207	2.1	9.1	1.70	.10
	276	2.8	8.8	1.89	.11
	345	3.4	7.9	2.27	.14
	414	4.1	7.9	2.65	.16
#0.75	207	2.1	9.8	2.65	.16
	276	2.8	9.8	3.03	.18
	345	3.4	10.1	3.41	.20
	414	4.1	10.1	3.79	.23
#1	207	2.1	9.1	4.16	.25
	276	2.8	9.8	4.92	.30
	345	3.4	10.1	5.68	.34
	414	4.1	10.1	6.06	.36
#2	207	2.1	11.6	8.71	.52
	276	2.8	11.6	9.46	.57
	345	3.4	12.2	10.22	.61
	414	4.1	12.8	11.36	.68
#2.5 PRE-INSTALLED	207	2.1	10.7	9.46	.57
	276	2.8	11.0	10.60	.64
	345	3.4	11.3	12.11	.73
	414	4.1	11.6	13.63	.82
#3	207	2.1	10.7	12.87	.77
	276	2.8	11.0	14.38	.86
	345	3.4	11.6	15.90	.95
	414	4.1	11.9	18.17	1.09
#4	207	2.1	12.8	15.52	.93
	276	2.8	13.4	17.41	1.04
	345	3.4	13.7	19.31	1.16
	414	4.1	14.0	21.58	1.29
#6	276	2.8	14.0	21.96	1.32
	345	3.4	14.6	24.23	1.45
	414	4.1	14.9	26.50	1.59
	483	4.8	14.9	28.39	1.70
#8	276	2.8	12.8	28.39	1.70
	345	3.4	13.7	31.04	1.86
	414	4.1	14.6	34.07	2.04
	483	4.8	14.6	35.96	2.16

LOW ANGLE DATA

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#1	30	26'	1.3
	40	27'	1.5
	50	27'	1.7
	60	28'	1.9
#3	30	29'	2.9
	40	30'	3.3
	50	31'	3.4
	60	33'	4.0
#4	30	28'	4.0
	40	31'	4.7
	50	34'	5.0
	60	36'	6.0
#6	40	30'	6.0
	50	34'	7.0
	60	37'	7.8
	70	38'	8.2

LOW ANGLE DATA, METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M^3/H
#1	207	2.1	7.9	4.92	.30
	276	2.8	8.2	5.68	.34
	345	3.4	8.2	6.44	.39
	414	4.1	8.5	7.19	.43
#3	207	2.1	8.8	10.98	.66
	276	2.8	9.1	12.49	.75
	345	3.4	9.4	12.87	.77
	414	4.1	10.1	15.14	.91
#4	207	2.1	8.5	15.14	.91
	276	2.8	9.4	17.79	1.07
	345	3.4	10.4	18.93	1.14
	414	4.1	11.0	22.71	1.36
#6	207	2.8	9.1	22.71	1.36
	276	3.4	10.4	26.50	1.59
	345	4.1	11.3	29.53	1.77
	414	4.8	11.6	31.04	1.86

Data represents test results in zero wind. Adjust for local conditions. Radius may be reduced with nozzle retention screw.

THE ROYAL MIRAGE

United Arab Emirates

One of the premier resorts in the UAE, the Royal Mirage is located on a 1km by 5km lush parcel on the Arabian Gulf. Local irrigation and landscape contractor, Desert Landscape Company, installed K-Rain rotors and sprinklers throughout the property.
The maintenance free integrity and sturdy construction of the product were the keys to choosing K-Rain for this project.

London-based Fitco Industries Ltd., distributes K-Rain products throughout the Middle East and supports their distributors with ongoing warranty and technical advice.

PHOTOS COURTESY OF FITCO INDUSTRIES, LTD.

MODELS

15003	Pro*Com*
15003-SS	Pro*Com* Stainless Steel

OTHER OPTIONS: ADD TO PART NUMBER

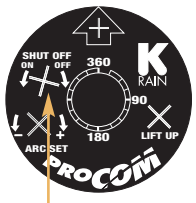
-LA	Low Angle Nozzle
-NN	No Nozzle
-RCW	Reclaimed Water Use

*PRO*COM™ 15003

Heavy-duty commercial grade features.

The PRO*COM*™ Rotor, packed with the superior heavy duty components of a sports turf rotor, is the answer to all of your commercial and industrial needs.

Available in plastic or the ever popular stainless steel, this product comes with nine nozzles and the shut-off feature (patent pending) included.



Patented Flow Shut-Off allows you to stop the flow right at the head.

FEATURES/BENEFITS

- Flow Shut-Off (patented)–Allows individual heads to be turned off during installation or adjustment–perfect for quick nozzle changes.
- 3/4" Inlet–Replaces all standard rotors.
- Revolutionary Patented Easy Arc Set–Simplified arc set allows for wet or dry adjustment in seconds.
- 2N1 Adjustable or Continuous Rotation–Provides a full range of adjustment from 40° to a continuous full circle.
- Patented Arc Set Degree Markings–Clearly indicates the current watering pattern and simplifies arc set adjustment.
- Arc Memory Clutch–Prevents internal gear damage and returns rotor to its prior setting automatically if nozzle turret is forced past its stop.
- Time Proven Patented Reversing Mechanism–Assures continuous reverse and return…over a 20 year history.
- Wide Selection of Nozzles–Including standard and low angle, provides flexibility in system design.
- Heavy Duty Rubber Cover–Seals out dirt, increases product durability and protects from injury.
- Rubber Mud Guard–Allows sprinkler to be installed below grade.
- Factory Installed Check Valve–Prevents low head drainage.
- Five Year Limited Warranty.

HOW TO SPECIFY

15003	-SS
Model Number	Description

EASY ARC SETTING

- Arc Selection 40° to Continuous 360°
  Adjust From Left Start

SPECIFICATIONS

- Inlet: 3/4" Threaded NPT
- Arc Adjustment Range: 40° to Continuous 360°
- Flow Range: .5 - 10.0 GPM
- Pressure Rating: 20 - 90 PSI
- Precipitation Rate: .06 to .50 Inches Per Hour (Depending on Spacing and Nozzle Used)
- Overall Height (Popped Down): 8 3/4"
- Recommended Spacing: 28' to 46'
- Radius: 22' to 50'
- Nozzle Trajectory: 26°
- Low Angle Nozzle Trajectory: 12°
- Standard and Low Angle Nozzle: Included
- Riser Height: 4"

FACT

Having grown from one employee in 1974, K-RAIN currently employs a diverse workforce of over 300 people.

K-RAIN PRO*COM*™ MODEL 15003

The ProCom is a gear-driven, rotary type sprinkler, capable of covering an area of 22' to 50' (6.7 to 15.3 M) radius at nozzle pressure of 20 to 90 PSI (1.4 to 6.2 bar) with a discharge rate of .5 to 10 GPM (1.89 to 37.85 LPM). The ProCom has a patented manual flow shut-off. The sprinkler is supplied with nine (9) numerically coded interchangeable nozzles. Nozzle trajectory is 26°. The ProCom is supplied with four (4) numerically coded interchangeable low angle nozzles. Low angle nozzle trajectory is 12°. The ProCom has a stainless steel radius adjustment screw.

The ProCom provides both part and full circle adjustment from 40° to continuous 360°. Coverage pattern is indicated by degree graduations and an arrow located on top of the sprinkler, which rotates to correspond with arc selected. True full circle operation by continuous forward rotation is achieved by alignment of the indication arrow with the "360°" position locator marked on the top cover. The rotor has a friction-clutch mechanism to allow for 360°+ forward or reverse movement of nozzle turret without damage to the internal gear components. The ProCom incorporates an "arc memory clutch" feature to allow original arc pattern to be automatically resumed following disturbance of nozzle turret setting.

The PRO*COM* has a minimum of 4-inch (10 cm) pop-up stroke and a 3/4-inch female thread inlet.

The PRO*COM* is available in stainless steel.

PROCOM ▪ PERFORMANCE DATA

PERFORMANCE

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#0.5	30	28'	.5
	40	29'	.6
	50	29'	.7
	60	30'	.8
#0.75	30	29'	.7
	40	30'	.8
	50	31'	.9
	60	32'	1.0
#1	30	32'	1.3
	40	33'	1.5
	50	34'	1.6
	60	35'	1.8
#2	30	37'	2.4
	40	40'	2.5
	50	42'	3.0
	60	43'	3.3
#2.5 PRE-INSTALLED	30	38'	2.5
	40	39'	2.8
	50	40'	3.2
	60	41'	3.5
#3	30	38'	3.6
	40	39'	4.2
	50	41'	4.6
	60	42'	5.0
#4	30	43'	4.4
	40	44'	5.1
	50	46'	5.6
	60	49'	5.9
#6	40	45'	5.9
	50	46'	6.0
	60	48'	6.3
	70	49'	6.7
#8	40	42'	8.0
	50	45'	8.5
	60	49'	9.5
	70	50'	10.0

METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M^3/H
#0.5	206	2.0	8.5	1.89	.11
	275	3.0	8.8	2.27	.14
	345	3.5	8.8	2.65	.16
	413	4.0	9.1	3.03	.18
#0.75	206	2.0	8.8	2.65	.16
	275	3.0	9.1	3.03	.18
	345	3.5	9.4	3.41	.20
	413	4.0	9.8	3.79	.23
#1	206	2.0	9.8	4.92	.14
	275	3.0	10.1	5.68	.18
	345	3.5	10.4	6.05	.20
	413	4.0	10.7	6.81	.23
#2	206	2.0	11.3	9.08	.54
	275	3.0	12.2	9.46	.56
	345	3.5	12.8	11.35	.68
	413	4.0	13.1	12.49	.75
#2.5 PRE-INSTALLED	206	2.04	11.6	9.46	.57
	275	2.72	11.9	10.60	.64
	345	3.40	12.2	12.11	.73
	413	4.08	12.5	13.25	.79
#3	206	2.0	11.6	13.63	.75
	275	3.0	11.9	15.89	.95
	345	3.5	12.5	17.41	1.04
	413	4.0	12.8	18.92	1.13
#4	206	2.0	13.1	16.65	.99
	275	3.0	13.4	19.30	1.15
	345	3.5	14.0	21.19	1.27
	413	4.0	14.9	22.33	1.33
#6	275	3.0	13.7	22.33	1.33
	345	3.5	14.0	22.71	1.36
	413	4.0	14.6	23.85	1.43
	483	5.0	14.9	25.35	1.52
#8	275	3.0	12.8	30.28	1.81
	345	3.5	13.7	32.12	1.92
	413	4.0	14.8	35.95	2.15
	483	5.0	15.3	37.85	2.27

LOW ANGLE DATA

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#1	30	22'	1.2
	40	24'	1.7
	50	26'	1.8
	60	28'	2.0
#3	30	29'	3.0
	40	32'	3.1
	50	35'	3.5
	60	37'	3.8
#4	30	31'	3.4
	40	34'	3.9
	50	37'	4.4
	60	38'	4.7
#6	40	38'	6.5
	50	40'	7.3
	60	42'	8.0
	70	44'	8.6

METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M^3/H
#1	207	2.04	6.71	4.54	.34
	275	2.72	7.32	6.43	.39
	344	3.40	7.92	6.80	.41
	413	4.08	8.53	7.56	.46
#3	207	2.04	8.84	11.34	.68
	275	2.72	9.75	11.72	.71
	344	3.40	10.67	13.23	.80
	413	4.08	11.58	14.36	.87
#4	207	2.04	9.45	12.85	.78
	275	2.72	10.36	14.74	.89
	344	3.40	11.28	16.63	1.00
	413	4.08	11.58	17.77	1.07
#6	275	2.72	11.58	24.57	1.68
	344	3.40	12.19	27.59	1.66
	413	4.08	12.80	30.24	1.82
	482	4.76	13.41	32.51	1.96

Data represents test results in zero wind. Adjust for local conditions. Radius may be reduced with nozzle retention screw.

MODELS

14003	Pro*Sport* Plastic
14003-SS	Pro*Sport* Stainless Steel
14003-BSP	Pro*Sport* w/BSP Thread
14003-BSP-SS	Pro*Sport* Stainless Steel w/BSP Thread
14053	Pro*Sport* High Speed Plastic
14053-SS	Pro*Sport* High Speed Stainless Steel
14053-BSP	Pro*Sport* High Speed w/BSP Thread
14053-BSP-SS	Pro*Sport* High Speed Stainless Steel w/BSP Thread

OTHER OPTIONS: ADD TO PART NUMBER

-NN	No Nozzle
-RCW	Reclaimed Water Use

PRO*SPORT*™ 14003

The PRO*SPORT*™ is K-Rain's next generation of professional rotors, designed specifically for sports turf applications with head spacing from 40 to 65 feet.

The PRO*SPORT*™ comes standard with a unique triple nozzle. The triple nozzle configuration consists of a primary nozzle for long distance and two secondary nozzles for mid-range and short distance coverage. This nozzle design provides even water distribution from 45 to 77 feet.

PRO*SPORT*™ comes in a high speed version, ideal for quick wet downs and dust control.

FEATURES/BENEFITS

- Revolutionary Patented Easy Arc Set–Simplified arc set allows for wet or dry adjustment in seconds.
- Triple Nozzle Configuration–Ensures even distribution of water.
- 2N1 Adjustable or Continuous Rotation–Provides a full range of adjustment from 40° to a continuous full circle.
- Patented Arc Set Degree Markings–Clearly indicates the current watering pattern and simplifies arc set adjustment.
- Arc Memory Clutch–Prevents internal gear damage and returns rotor to its prior setting automatically if nozzle turret is forced past its stop.
- Time Proven Patented Reversing Mechanism–Assures continuous reverse and return…over a 20 year history.
- Heavy Duty Rubber Cover / Rubber Mud Guard–Protects against physical injury and reduces liability, allows sprinkler to be installed below grade.
- Factory Installed Check Valve–Prevents low head drainage.
- Five Year Limited Warranty.

HOW TO SPECIFY

14003	-SS
Model Number	Description

EASY ARC SETTING

- Arc Selection 40° to Continuous 360°
  Adjust From Left Start

SPECIFICATIONS

- Inlet: 1" Threaded NPT Domestic 1" BSP: International
- Arc Adjustment Range: 40° to Continuous 360°
- Flow Range: 5.9 - 32.5 GPM
- Pressure Rating: 40 - 90 PSI
- Precipitation Rate: .3 to .78 Inches Per Hour (Depending on Spacing and Nozzle Used)
- Overall Height (Popped Down): 9 1/2"
- Recommended Spacing: 40' to 65'
- Radius: 45' to 77'
- Nozzle Trajectory: 26°
- Riser Height: 4"

FACT

K-RAIN'S new product concepts are developed, manufactured and tested in its Riviera Beach, Florida manufacturing facility. Harsh sun and sand conditions provide a natural proving ground for new ideas.

K-RAIN PRO*SPORT*™ MODEL 14003

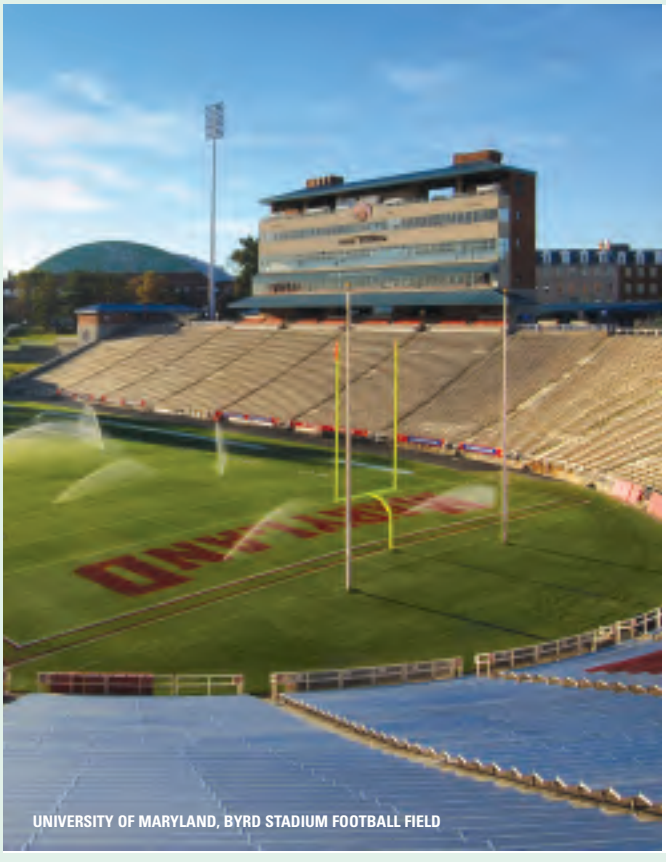
The ProSport is a gear-driven rotor capable of covering an area of 45' to 77' (13.7 to 23.5 M) radius at nozzle pressure of 40 to 90 PSI (2.76 to 6.21 bar) with a discharge rate of 5.9 to 32.5 GPM (22.3 to 123.0 LPM).

The ProSport is supplied with six (6) numerically coded interchangeable nozzles. Nozzle trajectory is 26° and incorporates three (3) discharge ports. The rotor has a stainless steel radius adjustment screw.

The ProSport provides both part and full circle adjustment from 40° to 360°. Coverage pattern is indicated by degree graduations and an arrow located on top of the sprinkler, which rotates to correspond with arc selected. True full circle operation by continuous rotation is provided by alignment of the indication arrow with the "360°" position locator marked on the top cover.

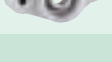
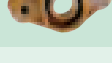
The rotor has a friction-clutch mechanism to allow for 360°+ forward or reverse movement of nozzle turret without damage to the internal gear components. The ProSport incorporates an "arc memory clutch" feature to allow original arc pattern to be automatically resumed following disturbance of nozzle turret setting.

The ProSport has a minimum of 4-inch (10 cm) pop-up stroke. The sprinkler has a 1-inch female thread inlet.

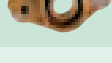

UNIVERSITY OF MARYLAND, BYRD STADIUM FOOTBALL FIELD

PRO*SPORT* ▪ PERFORMANCE DATA

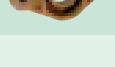
MODEL 14003 PERFORMANCE

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#5	40	45′	5.1
	50	47′	5.9
	60	47′	6.5
	70	49′	7.1
#10 PRE-INSTALLED 	50	53′	10.6
	60	53′	11.8
	70	53′	12.6
	80	55′	13.5
#15	50	57′	13.0
	60	59′	14.2
	70	59′	15.4
	80	63′	16.5
#20 	60	65′	18.9
	70	67′	20.5
	80	69′	21.9
	90	71′	23.2
#25 	60	67′	22.8
	70	71′	24.8
	80	75′	26.5
	90	77′	26.8
#30 	60	67′	23.7
	70	69′	25.6
	80	69′	27.5
	90	71′	29.2

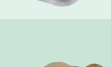
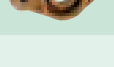
MODEL 14003 METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M³/H
#5	276	2.76	13.7	19.3	1.16
	345	3.45	14.3	22.3	1.34
	414	4.14	14.3	24.6	1.48
	483	4.83	14.9	26.9	1.61
#10 PRE-INSTALLED 	345	3.45	16.2	40.1	2.41
	414	4.14	15.9	44.3	2.66
	483	4.83	16.2	47.7	2.86
	552	5.52	16.8	51.1	3.06
#15	345	3.45	17.4	49.2	2.95
	414	4.14	18.0	53.8	3.23
	483	4.83	18.0	58.3	3.50
	552	5.52	19.2	62.5	3.75
#20 	414	4.14	19.8	71.5	4.29
	483	4.83	20.4	77.6	4.66
	552	5.52	21.0	82.9	4.97
	621	6.21	21.6	87.8	5.27
#25 	414	4.14	20.4	86.3	5.18
	483	4.83	21.6	93.9	5.63
	552	5.52	22.9	100.3	6.02
	621	6.21	23.5	101.4	6.08
#30 	414	4.14	20.4	89.7	5.38
	483	4.83	21.0	96.9	5.81
	552	5.52	21.0	104.1	6.25
	621	6.21	21.6	110.5	6.63

MODEL 14053 PERFORMANCE

NOZZLE	PRESSURE PSI	RADIUS FT.	FLOW GPM
#5 	40	43′	5.9
	50	44′	6.2
	60	45′	6.4
	70	45′	7.6
#10 PRE-INSTALLED 	50	49′	10.6
	60	53′	11.5
	70	53′	13.3
	80	54′	14.0
#15 	50	52′	12.4
	60	54′	13.6
	70	56′	14.6
	80	58′	15.9
#20	60	56′	19.8
	70	58′	21.2
	80	59′	22.8
	90	60′	24.4
#25 	60	59′	22.4
	70	66′	25.7
	80	67′	27.8
	90	68′	29.9
#30 	60	60′	25.2
	70	72′	28.5
	80	73′	30.8
	90	75′	32.5

MODEL 14053 METRIC

NOZZLE	PRESSURE kPa	PRESSURE BARS	RADIUS METERS	FLOW RATE L/M	FLOW RATE M³/H
#5 	276	2.76	13.11	22.3	1.34
	345	3.45	13.41	23.47	1.14
	414	4.14	13.72	24.22	1.45
	483	4.83	13.72	28.77	1.73
#10 PRE-INSTALLED 	345	3.45	14.94	40.12	2.41
	414	4.14	15.85	44.28	2.66
	483	4.83	16.15	50.34	3.02
	552	5.52	16.46	52.99	3.18
#15 	345	3.45	15.85	46.93	2.82
	414	4.14	16.46	58.67	3.52
	483	4.83	17.07	55.26	3.32
	552	5.52	17.68	60.18	3.61
#20	414	4.14	17.07	66.24	3.97
	483	4.83	17.68	71.54	4.29
	552	5.52	17.98	78.73	4.72
	621	6.21	18.29	82.14	4.93
#25 	414	4.14	17.98	84.78	5.09
	483	4.83	20.12	97.28	5.84
	552	5.52	20.42	105.23	6.31
	621	6.21	20.73	113.18	6.79
#30 	414	4.14	18.29	95.38	5.72
	483	4.83	21.95	107.88	6.47
	552	5.52	22.25	116.59	7.00
	621	6.21	22.86	123.03	7.38

Data represents test results in zero wind. Adjust for local conditions. Radius may be reduced with nozzle retention screw.

MODELS

73001	3" Pop-Up
74001	4" Pop-Up
74001-M	4" Pop-Up w/Male Thread Riser – Accepts Female Threaded Nozzles
76001	6" Pop-Up
71201	12" Pop-Up

OTHER OPTIONS: ADD TO PART NUMBER

-RCW	Reclaimed Water Use
-CV	Check Valve

K-SPRAY SERIES

K-Spray pop-ups are ideal for watering smaller areas, ground cover and shrub areas.

FOR MORE INFORMATION ON RCW PRODUCTS, PLEASE SEE PAGES 36 AND 37.

SPECIFICATIONS

- Pressure Rating: 20 - 50 PSI
- Flow Range: .5 - 4.6 GPM
- Precipitation Rate: .4 - 1.91 in./hr
- Inlet: 1/2" NPT Female Thread

FEATURES/BENEFITS

- Available in 3", 4", 6" and 12" Models–Provides flexibility in system design.
- Accepts Male Threaded Nozzles (Except Model 74001-M)
- Stainless Steel Retraction Spring–Provides reliable retraction of the riser in all soil conditions.
- Ratcheting Riser–Allows for easy pattern alignment by turning the riser.
- Heavy Duty Wiper Seal–Ensures leak free, full pop-up operation even under low-pressure situations.
- Optional Purple Cap for Reclaimed Water use–Highly visible for identification of reclaimed water systems reducing liability.
- Two Year Limited Warranty.

HOW TO SPECIFY

73001

Model Number

FOR NOZZLE SELECTION, PLEASE SEE PAGES 28-31.

SHRUB ADAPTER
PART # PSA

SPRAY HEAD CHECK VALVES PART # 53426

(OPTIONAL)

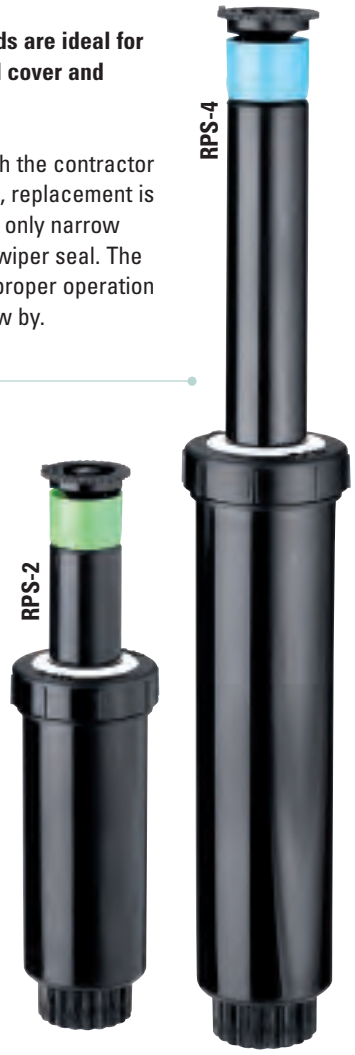
MODELS

RPS-2	2" Narrow Profile Spray Body
RPS-4	4" Narrow Profile Spray Body

NARROW PROFILE SPRAYS

K-Rain's RPS pop-up spray heads are ideal for watering smaller areas, ground cover and shrub areas.

RPS pop-up sprays are built with the contractor in mind. With the narrow profile, replacement is effortless. The RPS Spray is the only narrow profile spray with a co-molded wiper seal. The co-molded wiper seal ensures proper operation year after year with minimal flow by.



FOR NOZZLE SELECTION,
PLEASE SEE PAGES 28-31.

FEATURES/BENEFITS

- Available in 2" and 4" Models–Provides flexibility in system design.
- Accepts Female Threaded Nozzles
- Stainless Steel Retraction Spring–Provides reliable retraction of the riser in all soil conditions.
- Ratcheting Riser–Allows for easy pattern alignment by turning the riser.
- Co-Molded Wiper Seal – Ensures leak free, full pop-up operation even under low-pressure situations.
- Narrow Profile Body – Easy to retrofit with existing systems.
- Two Year Limited Warranty.

CO-MOLDED WIPER SEAL

CO-MOLDED WIPER SEAL
K-Rain's co-molded wiper seal reduces flow by-pass at start up and provides durability for longer life.

SPECIFICATIONS

- Pressure Rating: 20 - 50 PSI
- Flow Range: .5 - 4.6 GPM
- Precipitation Rate: .3 - 4.0 in./hr
- Inlet: 1/2" NPT Female Thread

HOW TO SPECIFY

RPS-2	***2" RPS***
Model Number	Description

MODELS

78002	2" Pop-Up
78003	3" Pop-Up
78004	4" Pop-Up
78006	6" Pop-Up
78012	12" Pop-Up
OTHER OPTIONS: ADD TO PART NUMBER	
-CV	Check Valve
-PR	Pressure Regulator (4, 6 & 12 inch models only)
-RCW	Reclaimed Water Use

SPECIFICATIONS

- Pressure Rating: 20 - 70 PSI
- Flow-by: 0 at 8 psi (0.6 bar) or greater; 0.10 GPM otherwise
- Overall Body Height:
  - 78002 - 4"
  - 78003 - 4 7/8"
  - 78004 - 6"
  - 78006 - 9 3/8"
  - 78012 - 16"
- Precipitation Rate: .4 - 4 in./hr
- Inlet: 1/2" NPT Female Thread

FEATURES/BENEFITS

- Co-Molded Wiper Seal–Ensures a leak free, full pop-up operation even under low-pressure situations. Cartridge design allows for easy removal and cleaning. Treated with UV inhibitors for long life. Seal is microbe resistant to reduce degradation and stick-ups.
- Accepts Female Threaded Nozzles
- Ratcheting Riser–Permits quick, easy alignment of spray pattern.
- Heavy-Duty Retraction Spring–Strongest spring in the industry for positive retraction in all soil conditions.
- Side and Bottom Inlets–On 6" and 12" models.
- Wide Selection of Sizes–Available in 2", 3", 4", 6" and 12" models.
- Pre-Installed Flush Cap
- Optional In-stem Pressure Regulator available for 4", 6" and 12" models
- Five Year Limited Warranty.

PRO-*S* SPRAYS

K-Rain introduces the new Pro-*S*, a rugged, contractor-friendly spray line. Available in 2", 3", 4", 6" and 12" pop-up heights, the The Pro-*S* spray is designed to be compatible with *all* standard female-threaded nozzles.

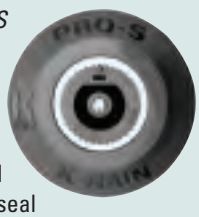
FOR NOZZLE SELECTION, PLEASE SEE PAGES 28-31.

CHECK VALVE
PART #P53428
(OPTIONAL)

HOW TO SPECIFY

78002	***2" PRO-S***
Model Number	Description

RUGGED CONSTRUCTION



The K-Rain Pro-*S* line of sprays is distinguished by its robust construction, rugged body and cap, co-molded seal and heavy-duty retraction spring.

CO-MOLDED WIPER SEAL

Ensures a leak free, full pop-up operation even under low-pressure situations. Unique cartridge design featuring microbe-resistant durable material prevents degradation and stick-ups.

Pre-installed flush cap.

Male threaded body is compatible with all standard female nozzles.

FIXED ROTARY NOZZLES

APPLICATION: RESIDENTIAL / LIGHT COMMERCIAL

MODELS

RN200-90	Rotary Nozzle – 90° Fixed Pattern (Black)
RN200-180	Rotary Nozzle – 180° Fixed Pattern (Green)
RN200-360	Rotary Nozzle – 360° Fixed Pattern (Red)

K-RAIN ROTARY NOZZLES

K-Rain's Rotary Nozzle provides increased uniform coverage over conventional fixed pattern spray nozzles while delivering matched precipitation.

The Rotary Nozzle is perfect for upgrading old irrigation systems by solving low pressure and coverage problems. The low precipitation rate of the nozzle is an excellent feature for reducing run-off on slopes or in tight soil conditions.

The K-Rain Rotary Nozzle has a FEMALE thread configuration to fit RPS, Pro-S and all other male spray bodies.

FEATURES/BENEFITS

- Matched Precipitation–Across various radii and patterns
- Low Precipitation Rate–Reduces run off
- Low Flow Rate–Less material, fewer zones
- 25% Radius Reduction–Patented flow control, no tools required
- Unique Speed Control–Maintains speed of rotation over varying pressure ranges
- Flexible Usage–Any pattern can be combined in the same zone with matched precipitation
- Large Filter–Prolongs product life
- System Flexibility–Can be Installed on the same zone with rotors
- Two Year Limited Warranty

SPECIFICATIONS

- Recommended Spacing: 13' - 17'
- Pressure Rating: 25 - 45 PSI
- Precipitation Rate: .67" to .99" per hour (depending on head spacing)

HOW TO SPECIFY

RN200	*-90°*
Model Number	Description

FIXED PATTERN ROTARY NOZZLES PERFORMANCE

METRIC

NOZZLE	NUMBER	PRESSURE (PSI)	RADIUS (FT.)	FLOW (GPM)	PRECIP IN/HR ▲	PRECIP IN/HR ■	PRESSURE (kPa / BAR)	RADIUS (M)	FLOW (LM)	PRECIP MM/HR ▲	PRECIP MM/HR ■
90°	RN200-90	25	13'	0.38	0.99	0.86	170 1.7	3.96	1.44	25	22
		30	14'	0.41	0.93	0.81	210 2.1	4.27	1.55	24	21
		35	15'	0.45	0.89	0.77	240 2.4	4.57	1.70	23	20
		40	16'	0.48	0.84	0.72	280 2.8	4.88	1.82	21	18
		45	17'	0.51	0.78	0.68	310 3.1	5.18	1.93	20	17
180°	RN200-180	25	13'	0.74	0.97	0.84	170 1.7	3.96	2.20	25	21
		30	14'	0.81	0.92	0.80	210 2.1	4.30	2.40	23	20
		35	15'	0.90	0.89	0.77	240 2.4	4.60	2.61	23	20
		40	16'	0.96	0.83	0.72	280 2.8	4.90	2.80	21	18
		45	17'	1.00	0.77	0.67	310 3.1	5.20	2.95	20	17
360°	RN200-360	25	13'	1.50	0.99	0.85	170 1.7	3.96	4.40	25	22
		30	14'	1.70	0.96	0.83	210 2.1	4.30	4.81	24	21
		35	15'	1.80	0.89	0.77	240 2.4	4.60	5.19	23	20
		40	16'	2.00	0.87	0.75	280 2.8	4.90	5.56	22	19
		45	17'	2.10	0.81	0.70	310 3.1	5.20	5.90	21	18

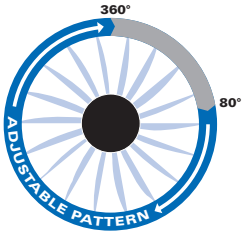
MODELS

RN200-ADJ	Adjustable Rotary Nozzle

K-RAIN ADJUSTABLE ROTARY NOZZLES

K-Rain's Rotary Nozzle provides increased uniform coverage over conventional fixed pattern spray nozzles while delivering matched precipitation. With adjustability from 80° to a full 360° in one nozzle, it offers flexibility in system design.

The highly efficient water delivery reduces soil erosion and runoff, saving water and money. Rotary Nozzles are the perfect solution for low water pressure areas. They are designed to operate at lower pressure while still delivering precise, even coverage.



Adjustable from 80° to 360°

FEATURES/BENEFITS

- Adjustable from 80° to 360°
- Female Thread
- Matched Precipitation–Across various radii and patterns
- Low Precipitation Rate–Reduces run off
- Low Flow Rate–Less material, fewer zones
- 20% Radius Reduction–Patented flow control, no tools required
- Unique Speed Control–Maintains speed of rotation over varying pressure ranges
- Flexible Usage–Any pattern can be combined in the same zone with matched precipitation
- Large Filter–Prolongs product life
- System Flexibility–Can be Installed on the same zone with rotors
- Two Year Limited Warranty

HOW TO SPECIFY

RN200	***-ADJ***
Model Number	Description

ADJUSTING THE ARC

The unique Adjustment tool allows for easy adjustment of the pattern while the system is on and provides a clear view of the setting alignment.

SPECIFICATIONS

- Recommended Spacing: 17' – 21'
- Pressure Rating: 25 – 45 PSI
- Precipitation Rate: .37 to .50 in/hr (depending on head spacing)

ADJUSTABLE ROTARY NOZZLES PERFORMANCE

ARC	PRESSURE (PSI)	RADIUS (FT.)	FLOW (GPM)	PRECIP IN/HR ▲	PRECIP IN/HR ■
90°	30	17	0.31	0.41	0.50
	40	19	0.40	0.39	0.46
	50	21	0.44	0.37	0.44
180°	30	17	0.59	0.41	0.50
	40	19	0.75	0.39	0.46
	50	21	0.85	0.37	0.44
360°	30	17	1.18	0.41	0.50
	40	19	1.49	0.39	0.46
	50	20	1.66	0.37	0.44

METRIC

PRESSURE (kPa / BAR)	RADIUS (M)	FLOW (LM)	PRECIP MM/HR ▲	PRECIP MM/HR ■
2.07	5.2	1.17	10	12
2.75	5.8	1.51	10	11
3.45	6.4	1.67	9	11
2.07	5.2	2.23	10	12
2.75	5.8	2.84	10	11
3.45	6.4	3.22	9	11
2.07	5.2	4.47	10	12
2.75	5.8	5.64	10	11
3.45	6.1	6.28	9	11

K-Rain's KV Male and KVF Female Adjustable Nozzles have a superior spray pattern that ensures proper precipitation rates throughout the adjustment. Extra long filters provide longer time between cleanings.

KV NOZZLES

K-Rain's KV Adjustable Nozzles have a MALE thread configuration to fit K-Rain K-Spray bodies.

MODELS

KV Nozzles

KV-8	8' Spray, Green
KV-10	10' Spray, Blue
KV-12	12' Spray, Brown
KV-15	15' Spray, Black
KV-17	17' Spray, Gray

HOW TO SPECIFY

KV-17 — Model Number
17' Gray — Description

KVF NOZZLES

K-Rain's KVF Adjustable Nozzles have a FEMALE thread configuration to fit RPS and PRO-S spray bodies and 4" K-Spray 74001-M.

MODELS

KVF Nozzles

KVF - 8	8' Spray, Green
KVF - 10	10' Spray, Blue
KVF - 12	12' Spray, Brown
KVF - 15	15' Spray, Black
KVF - 17	17' Spray, Gray

HOW TO SPECIFY

KVF-15 — Model Number
15' Black — Description

FIXED PATTERNED FEMALE NOZZLES

K-Rain's Matched Precipitation Female Nozzles are Compatible with all Available Male Threaded Bodies.

- Color-Coded
  –Allows for easy identification.
- Four Distances plus Eight Fixed Patterns
  –Provides an array of system configurations.
- Matched Precipitation
  –Allows for even water distribution

MODELS

Female Nozzles

FN - 8	8' Spray, Green
FN - 10	10' Spray, Blue
FN- 12	12' Spray, Brown
FN - 15	15' Spray, Black

See pages 30 & 31 for available fixed nozzle patterns.

HOW TO SPECIFY

FN8Q — Model Number
8' Fixed Quarter Pattern — Description

K-RAIN VARIABLE ARC NOZZLES

PERFORMANCE SPECIFICATIONS KV MALE THREAD NOZZLES

ARC	PRESSURE (PSI)	8' GREEN Radius (Ft)	8' GREEN Flow (GPM)	10' BLUE Radius (Ft)	10' BLUE Flow (GPM)	12' BROWN Radius (Ft)	12' BROWN Flow (GPM)	15' BLACK Radius (Ft)	15' BLACK Flow (GPM)	17' GRAY-KV ONLY Radius (Ft)	17' GRAY-KV ONLY Flow (GPM)
90	20	9	0.7	12	0.7	12	1.1	15	1.3	18	1.7
	30	9	1.1	12	1.1	13	1.3	17	1.6	18	1.8
	40	10	1.4	13	1.4	14	1.5	18	1.8	19	2.0
	50	11	1.5	14	1.5	15	1.7	19	2.0	20	2.2
180	20	8	1.4	11	1.4	11	1.6	14	1.8	17	1.9
	30	8	1.6	11	1.6	12	1.8	15	2.3	18	2.4
	40	9	1.8	12	1.8	13	2.2	16	2.6	19	2.6
	50	10	2.0	13	2.0	14	2.4	18	2.8	19	2.9
270	20	8	1.7	10	1.7	11	1.9	14	2.7	16	2.9
	30	8	2.0	10	2.0	12	2.4	15	3.2	17	3.4
	40	8	2.3	11	2.3	12	2.6	16	3.6	18	4.0
	50	9	2.6	12	2.6	13	3.0	16	4.0	18	4.5
360	20	8	2.2	10	2.2	11	2.8	13	3.4	15	3.5
	30	8	2.7	10	2.7	12	3.1	15	4.2	17	4.4
	40	8	3.0	11	3.0	12	3.5	15	4.7	17	4.9
	50	8	3.5	12	3.5	13	3.9	16	5.3	18	5.4

METRIC

ARC	PRESSURE kPa	PRESSURE BARS	8' GREEN Radius (M)	8' GREEN Flow (L/M)	10' BLUE Radius (M)	10' BLUE Flow (L/M)	12' BROWN Radius (M)	12' BROWN Flow (L/M)	15' BLACK Radius (M)	15' BLACK Flow (L/M)	17' GRAY-KV ONLY Radius (M	17' GRAY-KV ONLY Flow (L/M)
90	138	1.38	2.7	2.6	3.7	2.6	3.7	4.2	4.6	4.9	3.7	2.6
	207	2.07	2.7	4.2	3.7	4.0	4.0	4.9	5.2	6.1	5.5	6.8
	276	2.76	3.0	5.3	4.0	5.3	4.3	5.7	5.5	6.8	5.8	7.6
	345	3.45	3.4	5.7	4.3	5.7	4.6	6.4	5.8	7.6	6.1	8.3
180	138	1.38	2.4	5.3	3.4	5.3	3.4	6.1	4.3	6.8	5.2	7.2
	207	2.07	2.4	6.1	3.4	6.1	3.7	6.8	4.6	8.7	5.5	9.1
	276	2.76	2.7	6.8	3.7	6.8	4.0	8.3	4.9	9.8	5.8	9.8
	345	3.45	3.0	7.6	4.0	7.6	4.3	9.1	5.5	10.6	5.8	11.0
270	138	1.38	2.4	6.4	3.0	6.4	3.4	7.2	4.3	10.2	4.9	11.0
	207	2.07	2.4	7.6	3.0	7.6	3.7	9.1	4.6	12.1	5.2	12.9
	276	2.76	2.4	8.7	3.4	8.7	3.7	9.8	4.9	13.6	5.5	15.1
	345	3.45	2.7	9.8	3.7	9.8	4.0	11.4	4.9	15.1	5.5	17.0
360	138	1.38	2.4	8.3	3.0	8.3	3.4	10.6	4.0	12.9	4.6	13.2
	207	2.07	2.4	10.2	3.0	10.2	3.7	11.7	4.6	15.9	5.2	16.7
	276	2.76	2.4	11.4	3.4	11.4	3.7	13.2	4.6	17.8	5.2	18.5
	345	3.45	2.4	13.2	3.7	13.2	4.0	14.8	4.9	20.1	5.5	20.4

PERFORMANCE SPECIFICATIONS KVF FEMALE THREAD NOZZLES

ARC	PRESSURE (PSI)	8' GREEN Radius (Ft)	8' GREEN Flow (GPM)	10' BLUE Radius (Ft)	10' BLUE Flow (GPM)	12' BROWN Radius (Ft)	12' BROWN Flow (GPM)	15' BLACK Radius (Ft)	15' BLACK Flow (GPM)	17' GRAY-KV ONLY Radius (Ft)	17' GRAY-KV ONLY Flow (GPM)
90	20	9	0.40	9	0.40	10	0.45	13	0.55	17	0.80
	25	9	0.42	9	0.42	11	0.52	14	0.63	18	0.94
	30	10	0.45	10	0.45	12	0.55	15	0.70	19	1.05
	40	10	0.50	10	0.50	12	0.60	16	0.80	19	1.30
180	20	9	1.00	9	1.00	9	1.10	13	1.30	17	1.70
	25	9	1.10	9	1.10	10	1.21	14	1.49	17	1.92
	30	10	1.20	10	1.20	10	1.35	15	1.65	19	2.15
	40	10	1.25	10	1.25	11	1.53	16	2.00	19	2.50
270	20	9	1.40	9	1.40	9	1.60	13	1.90	16	2.40
	25	10	1.59	10	1.59	10	1.74	15	2.15	16	2.82
	30	10	1.75	10	1.75	10	1.95	15	2.35	17	3.00
	40	10	2.05	10	2.05	11	2.05	16	2.70	18	3.50
360	20	9	2.30	9	2.30	9	2.40	13	2.80	16	2.90
	25	10	2.51	10	2.51	10	2.61	14	3.26	17	3.40
	30	10	2.65	10	2.65	11	2.78	15	3.60	17	3.80
	40	11	2.75	11	2.75	12	3.03	15	4.10	17	4.40

METRIC

ARC	PRESSURE kPa	PRESSURE BARS	8' GREEN Radius (M)	8' GREEN Flow (L/M)	10' BLUE Radius (M)	10' BLUE Flow (L/M)	12' BROWN Radius (M)	12' BROWN Flow (L/M)	15' BLACK Radius (M)	15' BLACK Flow (L/M)	17' GRAY-KV ONLY Radius (M	17' GRAY-KV ONLY Flow (L/M)
90	138	1.38	2.7	1.5	2.7	1.5	3.0	1.7	4.0	2.1	5.2	3.0
	172	1.72	2.7	1.6	2.7	1.6	3.4	2.0	4.3	2.4	5.5	3.6
	207	2.07	3.0	1.7	3.0	1.7	3.7	2.1	4.6	2.6	5.8	4.0
	276	2.76	3.0	1.9	3.0	1.9	3.7	2.3	4.9	3.0	5.8	4.9
180	138	1.38	2.7	3.8	2.7	3.8	2.7	4.2	4.0	4.9	5.2	6.4
	172	1.72	2.7	4.2	2.7	4.2	3.0	4.6	4.3	5.6	5.2	7.3
	207	2.07	3.0	4.5	3.0	4.5	3.0	5.1	4.6	6.2	5.8	8.1
	276	2.76	3.0	4.7	3.0	4.7	3.4	5.8	4.9	7.6	5.8	9.5
270	138	1.38	2.7	6.1	2.7	5.3	2.7	6.1	4.0	7.2	4.9	9.1
	172	1.72	3.0	6.6	3.0	6.0	3.0	6.6	4.6	8.1	4.9	10.7
	207	2.07	3.0	7.4	3.0	6.6	3.0	7.4	4.6	8.9	5.2	11.4
	276	2.76	3.4	7.8	3.0	7.8	3.4	7.8	4.9	10.2	5.5	13.2
360	138	1.38	2.7	8.7	2.7	8.7	2.7	9.1	4.0	10.6	4.9	11.0
	172	1.72	3.0	9.5	3.0	9.5	3.0	9.9	4.3	12.3	5.2	12.9
	207	2.07	3.0	10.0	3.0	10.0	3.4	10.5	4.6	13.6	5.2	14.4
	276	2.76	3.4	10.4	3.4	10.4	3.7	11.5	4.6	15.5	5.2	16.7

FIXED PATTERN NOZZLE PERFORMANCE

FEMALE THREAD

8' ft.

NOZZLE	NUMBER	PRESSURE (PSI)	RADIUS (FT.)	FLOW (GPM)
90°	FN8Q	15	5'	0.18
		20	6'	0.21
		25	7'	0.24
		30	8'	0.26
180°	FN8H	15	5'	0.37
		20	6'	0.42
		25	7'	0.47
		30	8'	0.52
270°	FN8TQ	15	5'	0.55
		20	6'	0.63
		25	7'	0.71
		30	8'	0.78
360°	FN8F	15	5'	0.74
		20	6'	0.86
		25	7'	0.96
		30	8'	1.05

8' ft. Metric

NOZZLE	NUMBER	PRESSURE (kPa / BAR)	RADIUS (M)	FLOW (L/M)
90°	FN8Q	100 1.0	1.7	.68
		150 1.5	2.1	.79
		200 2.0	2.4	.91
		210 2.1	2.4	.98
180°	FN8H	100 1.0	1.7	1.4
		150 1.5	2.1	1.6
		200 2.0	2.4	1.8
		210 2.1	2.4	2.0
270°	FN8TQ	100 1.0	1.7	2.1
		150 1.5	2.1	2.4
		200 2.0	2.4	2.7
		210 2.1	2.4	3.0
360°	FN8F	100 1.0	1.7	2.8
		150 1.5	2.1	3.3
		200 2.0	2.4	3.6
		210 2.1	2.4	4.0

10' ft.

NOZZLE	NUMBER	PRESSURE (PSI)	RADIUS (FT.)	FLOW (GPM)
90°	FN10Q	15	7'	0.29
		20	8'	0.33
		25	9'	0.36
		30	10'	0.39
180°	FN10H	15	7'	0.58
		20	8'	0.65
		25	9'	0.72
		30	10'	0.79
270°	FN10TQ	15	7'	0.87
		20	8'	0.98
		25	9'	1.08
		30	10'	1.18
360°	FN10F	15	7'	1.16
		20	8'	1.30
		25	9'	1.44
		30	10'	1.58

10' ft. Metric

NOZZLE	NUMBER	PRESSURE (kPa / BAR)	RADIUS (M)	FLOW (L/M)
90°	FN10Q	100 1.0	2.1	1.1
		150 1.5	2.4	1.2
		200 2.0	3.0	1.4
		210 2.1	3.1	1.5
180°	FN10H	100 1.0	2.1	2.2
		150 1.5	2.4	2.5
		200 2.0	3.0	2.7
		210 2.1	3.1	3.0
270°	FN10TQ	100 1.0	2.1	3.3
		150 1.5	2.4	3.7
		200 2.0	3.0	4.1
		210 2.1	3.1	4.5
360°	FN10F	100 1.0	2.1	4.4
		150 1.5	2.4	4.9
		200 2.0	3.0	5.5
		210 2.1	3.1	60

12' ft.

NOZZLE	NUMBER	PRESSURE (PSI)	RADIUS (FT.)	FLOW (GPM)
90°	FN12Q	15	9'	0.45
		20	10'	0.53
		25	11'	0.60
		30	12'	0.65
180°	FN12H	15	9'	0.90
		20	10'	1.05
		25	11'	1.20
		30	12'	1.30
270°	FN12TQ	15	9'	1.35
		20	10'	1.58
		25	11'	1.80
		30	12'	1.95
360°	FN12F	15	9'	1.80
		20	10'	2.10
		25	11'	2.40
		30	12'	2.60

12' ft. Metric

NOZZLE	NUMBER	PRESSURE (kPa / BAR)	RADIUS (M)	FLOW (L/M)
90°	FN12Q	100 1.0	2.7	1.7
		150 1.5	3.2	2.0
		200 2.0	3.6	2.3
		210 2.1	3.7	2.5
180°	FN12H	100 1.0	2.7	3.4
		150 1.5	3.2	4.0
		200 2.0	3.6	4.5
		210 2.1	3.7	4.9
270°	FN12TQ	100 1.0	2.7	5.1
		150 1.5	3.2	6.0
		200 2.0	3.6	6.8
		210 2.1	3.7	7.4
360°	FN12F	100 1.0	2.7	6.8
		150 1.5	3.2	7.9
		200 2.0	3.6	9.1
		210 2.1	3.7	9.8

Data represents test results in zero wind. Adjust for local conditions. Radius may be reduced with nozzle retention screw.

FEMALE THREAD (CON'T)

15' ft.

NOZZLE	NUMBER	PRESSURE (PSI)	RADIUS (FT.)	FLOW (GPM)
90°	FN15Q	15	11'	0.65
		20	12'	0.75
		25	14'	0.82
		30	15'	0.92
180°	FN15H	15	11'	1.30
		20	12'	1.50
		25	14'	1.65
		30	15'	1.85
270°	FN15TQ	15	11'	1.95
		20	12'	2.25
		25	14'	2.48
		30	15'	2.78
360°	FN15F	15	11'	2.60
		20	12'	3.00
		25	14'	3.30
		30	15'	3.70

15' ft. Metric

NOZZLE	NUMBER	PRESSURE (kPa / BAR)	RADIUS (M)	FLOW (L/M)
90°	FN15Q	100 1.0	3.4	2.5
		150 1.5	3.9	2.8
		200 2.0	4.5	3.1
		210 2.1	4.6	3.5
180°	FN15H	100 1.0	3.4	4.9
		150 1.5	3.9	5.7
		200 2.0	4.5	6.2
		210 2.1	4.6	7.0
270°	FN15TQ	100 1.0	3.4	7.4
		150 1.5	3.9	8.6
		200 2.0	4.5	9.4
		210 2.1	4.6	10.6
360°	FN15F	100 1.0	3.4	9.8
		150 1.5	3.9	11.4
		200 2.0	4.5	12.5
		210 2.1	4.6	14.0

MALE THREAD

12' ft.

NOZZLE	NUMBER	PRESSURE (PSI)	RADIUS (FT.)	FLOW (GPM)
90°	P12Q	20	11'	0.5
		25	12'	0.7
		40	13'	0.8
		50	14'	0.9
180°	P12H	20	11'	0.9
		25	12'	1.1
		40	13'	1.4
		50	14'	1.5
270°	P12TQ	20	12'	1.2
		25	12'	1.4
		40	14'	1.7
		50	15'	2.0
360°	P12F	20	10'	1.6
		25	12'	1.8
		40	13'	2.1
		50	14'	2.4

12' ft. Metric

NOZZLE	NUMBER	PRESSURE (kPa / BAR)	RADIUS (M)	FLOW (L/M)
90°	P12Q	150 1.5	3.4	1.9
		200 2.0	3.7	2.6
		300 3.0	4.0	3.0
		350 3.5	4.3	3.4
180°	P12H	150 1.5	3.4	3.4
		200 2.0	3.7	4.2
		300 3.0	4.0	5.3
		350 3.5	4.3	5.7
270°	P12TQ	150 1.5	3.7	4.5
		200 2.0	3.7	5.3
		300 3.0	4.3	6.4
		350 3.5	4.6	7.6
360°	P12F	150 1.5	3.0	6.1
		200 2.0	3.7	6.8
		300 3.0	4.0	7.9
		350 3.5	4.3	9.1

15' ft.

NOZZLE	NUMBER	PRESSURE (PSI)	RADIUS (FT.)	FLOW (GPM)
90°	P15Q	20	15'	0.7
		30	16'	0.9
		40	17'	1.1
		50	18'	1.2
180°	P15H	20	14'	1.4
		30	15'	1.7
		40	16'	2.0
		50	17'	2.2
270°	P15TQ	20	13'	2.0
		30	15'	2.5
		40	16'	2.9
		50	16'	3.2
360°	P15F	20	13'	2.9
		30	15'	3.6
		40	16'	4.1
		50	17'	4.6

15' ft. Metric

NOZZLE	NUMBER	PRESSURE (kPa / BAR)	RADIUS (M)	FLOW (L/M)
90°	P15Q	150 1.5	4.6	2.6
		200 2.0	4.9	3.4
		300 3.0	5.2	4.2
		350 3.5	5.5	4.5
180°	P15H	200 2.0	4.3	5.3
		300 3.0	4.6	6.4
		400 4.0	4.9	7.6
		500 5.0	5.2	8.3
270°	P15TQ	200 2.0	4.0	7.6
		300 3.0	4.6	9.5
		400 4.0	4.9	11.0
		500 5.0	4.9	12.1
360°	P15F	200 2.0	4.0	11.00
		300 3.0	4.6	13.6
		400 4.0	4.9	15.5
		500 5.0	5.2	17.4

SPECIAL PATTERNS

15' ft.

PATTERN	MALE #	FEMALE#	PRESSURE (PSI)	RADIUS (FT.)	FLOW (GPM)
CENTER STRIP	15CS	FN15CS	20	4' x 24'	0.8
			30	4' x 30'	1.0
END STRIP	15ES	FN15ES	20	4' x 12'	0.4
			30	4' x 15'	0.5
SIDE STRIP	15SS	FN15SS	20	4' x 28'	1.1
			30	5' x 32'	1.3
HIGH LOW	15HL	FN15HL	20	H 14' x L4' x 28'	2.5
			30	H 15' x L5' x 32'	3.0

15' ft. Metric

PRESSURE (kPa / BAR)	RADIUS (M)	FLOW (L/M)
150 1.5	1.2 x 7.3	3.0
200 2.0	1.2 x 9.1	3.8
150 1.5	1.2 x 7.3	1.5
200 2.0	1.2 x 4.6	1.9
150 1.5	1.2 x 8.5	4.2
200 2.0	1.5 x 9.8	4.9
150 1.5	4.3 x 1.2 x 8.5	9.5
200 2.0	4.6 x 1.5 x 9.8	11.4

Data represents test results in zero wind. Adjust for local conditions. Radius may be reduced with nozzle retention screw.

MODELS

7001	1" Female Thread or 1-1/4" Slip
7001-SL	1" Female Slip or 1-1/4" Slip
7001-BSP	1" Female BSP Thread or 1-1/4" Slip
7001-NFC	1" Female Thread or 1-1/4" Slip Without Flow Control
7001-SL-NFC	1" Female Slip or 1 1/4" Slip Without Flow Control
7001-BSP-NFC	1" Female BSP Thread or 1 1/4" Slip Without Flow Control
7001-MXB	1" Male X Barb
7001-MXB-NFC	1" Male X Barb Without Flow Control

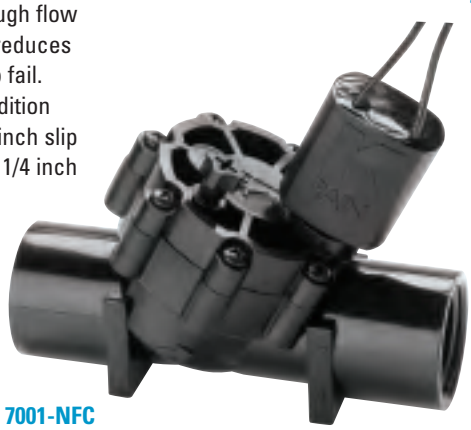
PRO*SERIES* 100 VALVE

A contemporary tilt diaphragm design makes the PROSERIES 100 Valve the perfect choice for residential and commercial applications. This reliable valve offers a straight through flow pattern that dramatically reduces pressure loss and reduces the risk of trapped debris that causes other brands to fail. It has both an internal bleed and external bleed in addition to optional flow control. The inside diameter (ID) is 1 inch slip and glue or NPT/BSP. The outside diameter (OD) is 1 1/4 inch slip for added installation flexibility

7001

SPECIFICATIONS

- Dimensions: HEIGHT: 4"
  WIDTH: 3"
  LENGTH: 5-1/4"
- Flow Range: .75 - 35 GPM
- Pressure Rating: 20 - 150 PSI
- Pressure Loss @ 30 GPM - 5 PSI
- Solenoid: 24 VAC 60 Cycle
- Inrush Current: .43 Amps
- Holding Current: .25 Amps



7001-NFC

PRO*SERIES* 100 VALVE MALE THREAD X BARB

K-Rain expands the popular ProSeries 100 Valve line with the Male X Barb 1" Valve.

The Male X Barb Valve is designed for polyethylene piping systems, requires fewer fittings and can be installed quickly.

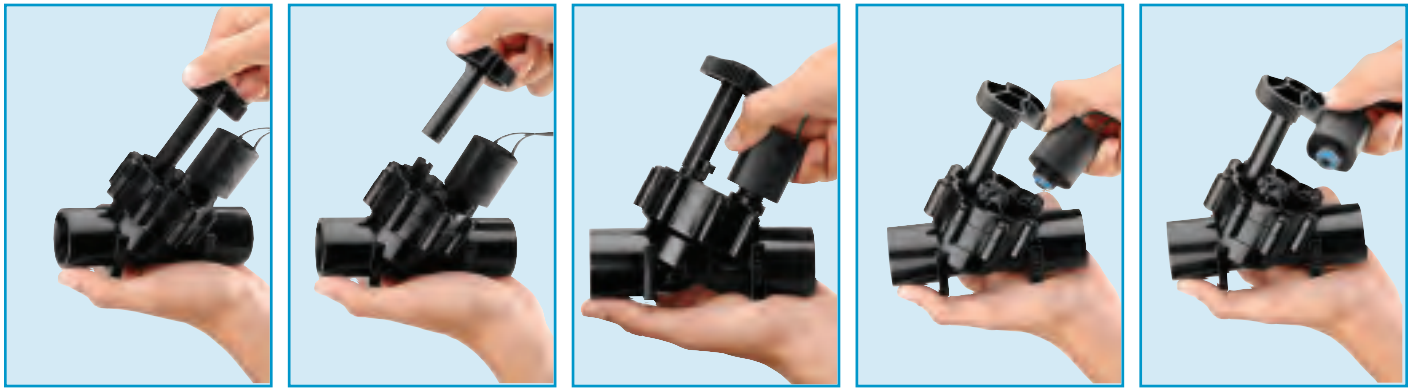
7001-MXB

FLOW THROUGH

The unique tilted diaphragm creates a better flow path than traditional globe style electric valves by decreasing friction loss and increasing flow rate.

SELF-CLEANING SCREEN

The straight flow path allows debris to move through and the turbulent water flow cleans the diaphragm filter screen. This provides long life in applications using well or lake water.



MANUAL FLOW CONTROL
Precisely adjust flow and shut off manually. Removable handle prevents tampering.

CAPTURED PLUNGER SOLENOID
K-Rain's solenoid with captured plunger allows for easy removal when servicing without losing internal parts. Epoxy encapsulated solenoid design ensures longevity unlike the competition's overmolded solenoid.

FEATURES/BENEFITS

- Heavy Duty, Corrosion and UV Resistant PVC Construction–Increases the life of the valve.
- Combination 1" and 1 1/4"–Provides the option to increase the pipe size to the valve increasing the flow rate.
- Tilt Diaphragm/Piston Assembly–Allows for a straight flow path of the water increasing the flow rate while reducing the friction loss.
- Debris Tolerant Design–Provides flexibility for use in potable or dirty water applications.
- Manual External Bleed Screw–Provides for manual operation in system start up.
- Manual Internal Bleed Through Solenoid–Provides for manual operation without discharging water outside the valve.
- Flow Control with Removable Handle–Allows for precise flow adjustment and manual shut off and allows you to remove the handle to prevent tampering (Except 7001-NFC).
- Captured Plunger–Allows for the solenoid to be removed without losing the internal plunger.
- Self Cleaning Metering Screen–Screen is in the turbulent flow of the water allowing self cleaning action during operation.
- Five Year Limited Warranty.

HOW TO SPECIFY

7001	1" - 1¼"
Model Number	Size

K-RAIN PROSERIES 100 MODEL 7001: ELECTRIC VALVE

Construction:
The valve body is constructed of corrosion and UV resistant PVC material. Valve is available in NPT, welded slip and BSP configurations. The valve is manufactured for 3 different applications:

1. to accept 1" female slip or 1 1/4" slip installation within the same unit.
2. to accept 1" female thread or 1 1/4" slip installation within the same unit.
3. to accept 1" female BSP thread or 1 1/4" slip installation within the same unit.

Design of valve is high flow, low friction loss and includes optional flow control for precise flow adjustment and manual shut off. Valve has debris tolerant design to accommodate dirty water conditions. Valve has a manual external bleed and removable tamper-resistant flow control handle. Valve has a diaphragm piston assembly with a 50 mesh filter screen in the turbulent flow for self-cleaning purposes. Valve is controlled by a 24 VAC encapsulated solenoid, .43 amp inrush and .25 amp holding.

Operation:
Valve has a working pressure range from 20 PSI (1.38 bars) minimum to 150 PSI (10.34 bars) maximum and a recommended flow range from 5 to 30 GPM (20 to 114 LPM).

MODELS

7101	1" Female Thread, NPT
7101-SL	1" Female Slip
7101-BSP	1" Female Thread, BSP
7101-J	1" Female Thread Jar-Top, NPT
7101-J-SL	1" Female Slip Jar-Top
7101-J-BSP	1" Female Thread Jar-Top, BSP

PRO*SERIES* 150 VALVES

K-Rain's ProSeries 150 Valves offer the irrigation professional a wide array of features and benefits.

The 1" valve has a removable metering pin and external bleed screw promoting easy maintenance and manual operation.

The Jar-Top provides the professional easy servicing access without removing the valve from the system.

7101

7101-J

NO TOOLS NEEDED

The K-Rain Jar-Top valve allows for quick and easy servicing after installation.

MANUAL EXTERNAL BLEED SCREW

The 1", 1 ½" and 2" models feature a removable external bleed screw and metering pin to simplify cleaning and maintenance. With the External Bleed Screw, manual operation during start up is easy.

HOW TO SPECIFY

7101 — Model Number

1" Thread — Size

FEATURES/BENEFITS ProSeries 150 - 1" Valve

- Heavy Duty, Corrosion and UV Resistant PVC Construction –Increases the life of the valve.
- External Bleed Screw with Removable Metering Pin–Allows for easy cleaning of the metering pin without disassembling the valve.
- Manual External Bleed Screw–Provides for manual operation in system start up.
- Manual Internal Bleed through Solenoid–Provides for manual operation without discharging water outside the valve.
- Captured Plunger–Allows for the solenoid to be removed without losing the internal plunger.
- Five Year Limited Warranty.

FEATURES/BENEFITS ProSeries 150 - 1" Jar-Top Valve

- Heavy Duty, Corrosion and UV Resistant PVC Construction –Increases the life of the valve.
- Threaded Jar-Top–Allows for quick removal of the cap for easy servicing after installation.
- Manual External Bleed Screw–Provides for manual operation in system start up.
- Manual Internal Bleed through Solenoid–Provides for manual operation without discharging water outside the valve.
- Captured Plunger–Allows for the solenoid to be removed without losing the internal plunger.
- Glass-Filled Nylon Screw Cap–Increased durability.
- Five Year Limited Warranty.

SPECIFICATIONS

Operating Specifications

- Pressure range: 10-150 psi
- Flow Range: .25 - 30 GPM

Electrical Specifications

- Standard solenoid: 24 VAC 60 Cycle
- Inrush current: .4 amp
- Holding current: .2 amp

ProSeries 150 1" VALVE-7101

- Dimensions: HEIGHT: 5 1/4" WIDTH: 3 1/8" LENGTH: 5"

ProSeries 150 1" VALVE WITH JAR-TOP -7101-J

- Dimensions: HEIGHT: 5 1/4" WIDTH: 3" LENGTH: 4 3/8"

OPERATING SPECIFICATIONS

ProSeries 150 1" VALVE					
FLOW RATE - GPM	5	10	15	20	30
PSI LOSS	2.9	2.1	1.8	3.0	5.0
ProSeries 150 1" VALVE WITH JAR-TOP					
FLOW RATE - GPM	5	10	15	20	30
PSI LOSS	3.3	3.9	2.9	3.2	6.1

PRESSURE RANGE: 10-150 PSI

MODELS	
7115	1 1/2" Female Thread, NPT
7115-BSP	1 1/2" Female Thread, BSP
7102	2" Female Thread, NPT
7102-BSP	2" Female Thread, BSP

PRO*SERIES* 150 VALVES

The 1.5" and 2" models feature a removable inlet cap to easily modify the configuration from globe to angle style. They also have a removable metering pin and external bleed screw promoting easy maintenance and manual operation.

HOW TO SPECIFY

7102 *2" Thread*

Model Number — Size

SYSTEM FLEXIBILITY

Removable inlet cap allows for easy conversion from globe to angle-style valve.

FEATURES/BENEFITS ProSeries 150 - 1 1/2" & 2" Valves

- Heavy Duty, Corrosion and UV Resistant PVC Construction –Increases the life of the valve.
- External Bleed Screw with Removable Metering Pin–Allows for easy cleaning of the metering pin without disassembling the valve.
- Manual External Bleed Screw–Provides for manual operation in system start up.
- Manual Internal Bleed through Solenoid–Provides for manual operation without discharging water outside the valve.
- Removable Inlet Cap–Allows for easy conversion from globe to angle-style valve.
- Flow Control–Allows for precise flow adjustment and manual shut off.
- Captured Plunger–Allows for the solenoid to be removed without losing the internal plunger.
- Heavy Duty Santoprene® Diaphragm–Unique design improves durability of diaphragm.
- Five Year Limited Warranty.

SPECIFICATIONS

Operating Specifications

- Pressure range: 20-150 psi
- Flow Range: 5 - 120 GPM

Electrical Specifications

- Standard solenoid: 24 VAC 60 Cycle
- Inrush current: .4 amp
- Holding current: .2 amp

ProSeries 150 1 1/2" VALVE-7115

- Dimensions: HEIGHT: 8" WIDTH: 4 1/4" LENGTH: 5 1/2"

ProSeries 150 2" VALVE-7102

- Dimensions: HEIGHT: 8 7/8" WIDTH: 4 7/8" LENGTH: 6 1/3"

OPERATING SPECIFICATIONS

ProSeries 150 1 1/2" VALVE

FLOW RATE - GPM		20	30	40	50	60	80
PSI LOSS	GLOBE	3.0	2.6	2.3	2.9	4.1	5.5
	ANGLE	2.7	2.2	1.9	2.2	3.0	4.4

ProSeries 150 2" VALVE

FLOW RATE - GPM		20	30	40	50	60	80	100	120
PSI LOSS	GLOBE	2.0	1.9	1.7	1.5	1.6	2.9	4.8	6.2
	ANGLE	1.9	1.9	1.7	1.5	1.5	2.1	3.2	4.6

PRESSURE RANGE: 10-150 PSI

MODELS

7201	1" Female Thread
7201-J	1" Female Thread Jar-Top
7215	1 1/2" Female Thread
7202	2" Female Thread
7201-BSP	1" Female Thread, BSP
7215-BSP	1 1/2" Female Thread, BSP
7202-BSP	2" Female Thread, BSP

RPS 200

The RPS 200 Valve is a durable feature packed electric valve designed to handle irrigation applications up to 200 psi.

FEATURES/BENEFITS

- Durable glass-filled nylon construction and reinforced rubber diaphragm–ensures long life and reliable performance.
- Flow control to adjust water flow as needed (except 7201-J).
- Large internal openings and self cleaning diaphragm during every cycle–reduces maintenance time.
- Water flow indicator–ensures proper installation every time.
- Captured Plunger–Allows for the solenoid to be removed without losing the internal plunger.
- Electric or manual operation.
- Two Year Limited Warranty.

SPECIFICATIONS

Operating Specifications

- Pressure range: 6-200 psi

Electrical Specifications

- Standard solenoid: 24 VAC
- Inrush current: .375 amp
- Holding current: .250 amp

RPS 200 SERIES 1" VALVE–7201

- Dimensions: HEIGHT: 5 1/4" WIDTH: 3 1/8" LENGTH: 5 1/8"

RPS 200 SERIES 1" VALVE WITH JAR-TOP–7201-J

- Dimensions: HEIGHT: 5 3/4" WIDTH: 3 1/8" LENGTH: 4 3/4"

RPS 200 SERIES 1 1/2" VALVE–7215

- Dimensions: HEIGHT: 6 3/4" WIDTH: 4 1/4" LENGTH: 6 1/4"

RPS 200 SERIES 2" VALVE–7202

- Dimensions: HEIGHT: 7" WIDTH: 4 1/4" LENGTH: 7 1/4"

OPERATING SPECIFICATIONS

RPS 200 SERIES 1" VALVE

FLOW RATE - GPM	5	10	15	20	25	30	40
PSI LOSS	.4	1.16	2.45	4.65	7.25	9.70	15.9

RPS 200 SERIES 1" VALVE WITH JAR-TOP

FLOW RATE - GPM	5	10	15	20	25	30	40
PSI LOSS	1.45	1.90	3.00	5.80	8.75	10.70	18.00

RPS 200 SERIES 1 1/2" VALVE

FLOW RATE - GPM	20	25	30	40	50	60	80	100
PSI LOSS	2.73	3.04	2.90	2.90	3.41	4.24	7.61	12.9

RPS 200 SERIES 2" VALVE

FLOW RATE - GPM	20	25	30	40	50	60	80	100	120	150
PSI LOSS	2.90	2.54	2.17	2.17	2.75	3.40	5.50	7.83	11.66	20.0

PRESSURE RANGE: 6-200 PSI

HOW TO SPECIFY

7201	*1" Thread*
Model Number	Size

MODELS

3504	4 Station, 110 Volt External Transformer
3504-220	4 Station, 220 Volt External Transformer
3506	6 Station, 110 Volt External Transformer
3506-220	6 Station, 220 Volt External Transformer

RPS 46 MINI IRRIGATION CONTROLLER

Designed for residential applications, the RPS 46 has four individual programs to allow for efficient watering on separate programs.

A key feature of this unit is the water budgeting feature which allows easy adjustment of watering schedules as the seasons change.

FEATURES/BENEFITS

- 4 & 6 Station Models–Perfect for residential lawns.
- 4 Fully Independent Programs–Allowing up to 4 starts per program. Maximum 16 starts per day.
- Indoor Models with External Transformer and Plug.
- Seasonal Adjustment–Allows for quick adjustment of watering durations in 25% increments, from 25% to 150%.
- Rain Sensor Ready–Accepts rain sensor and is controlled by bypass switch.
- Flexible Manual Operation–Run a program, run a station or test system.
- Battery Back-Up–Saves program during power outages.
- Two Year Limited Warranty.

SPECIFICATIONS

Operating Specifications

- Dimensions: HEIGHT: 5.7"
  WIDTH: 4.5"
  DEPTH: 1.7"
- Station Run Times: 1 min. to 12 hours 59 min.
- Programs: 4
- Start Times: 4 per program
- Watering Schedule: 7 day calendar with individual day selection, ODD/ EVEN day or interval watering.
- Rain Sensor Ready: Inhibits automatic watering when wet conditions are detected by a suitable rain sensor.
- Master valve/Pump start terminal.
- Automatic, semi-automatic & single station manual operation.

Electrical Specifications

- Electrical Power Supply: 110-120 VAC/60Hz/230 VAC 50Hz
- Electrical Outputs: 24 Volt AC, 0.85 AMP
- To Solenoid Valve: 24 VAC 50/60 Hz 0.5 AMPS max.
- Total output load must not be exceeded by the valves and pump start requirements.
- Overload protection: Standard 20mm 1.0 AMP fuse
- Power Failure: 9 Volt standard alkaline battery maintains clock and program up to 2 weeks.
- Wiring: The output circuits should be installed and protected in accordance with wiring rules.

HOW TO SPECIFY

3504	4
Model Number	No. of Stations

RPS 469 CONTROLLER

APPLICATION: RESIDENTIAL / LIGHT COMMERCIAL

MODELS

3604	4 station, 110 Volt internal transformer
3604-220	4 station, 220 Volt internal transformer
3606	6 station, 110 Volt internal transformer
3606-220	6 station, 220 Volt internal transformer
3609	9 station, 110 Volt internal transformer
3609-220	9 station, 220 Volt internal transformer

RPS 469 MID-SIZE IRRIGATION CONTROLLER

Designed for residential & light commercial applications, the RPS 469 has six individual programs to allow for efficient watering on separate programs. This product features Rain Sensor Ready (RSR) technology which allows individual stations to be controlled by a rain sensor.

FEATURES/BENEFITS

- 4, 6 & 9 Station Models–Perfect for residential & light commercial applications.
- 6 fully Independent Programs–Allowing up to 6 starts per program. Maximum 36 starts per day.
- Indoor/Outdoor
- Water Conservative–Allows for quick adjustment of watering durations in 10% increments, from 10% to 200.
- Rain Sensor Ready–Accepts rain sensor and allows individual stations to be set and controlled by the sensor.
- Flexible Manual Operation–Automatic, semi-automatic and single station manual.
- System Test–Allows a full system check for valve operation.
- Permanent Memory–Saves programs during power outages.
- Weatherproof Enclosure–Ensures long product life.
- Two Year Limited Warranty.

SPECIFICATIONS

Operating Specifications

- Dimensions: HEIGHT: 8.8"
  WIDTH: 7.9"
  DEPTH: 2.9"
- Station Run Times: 1 min. to 12 hours 59 min.
- Programs: 6
- Start Times: 6 per program
- Water Schedule: 7 day calendar with individual day selection, or 1 to 15 day interval watering, or 365 day calendar for ODD/EVEN day watering.
- Rain Sensor Ready
- Inhibits automatic watering when wet conditions are detected by a suitable rain sensor.
- Master Valve/pump can be enabled or disabled by station or by program.
- Automatic, semi-automatic & single station manual operation.
- Capable of programming remotely using a standard 9 Volt alkaline battery. Permanent memory saves programs during power outages.

Electrical Specifications

- Electrical Power Supply: 110-120 VAC/60Hz/230 VAC 50Hz
- Electrical Outputs: 24 Volts AC, 1.0 AMP
- To Solenoid Valve: 24 VAC 50/60 Hz 0.75 AMPs max. **Note:** up to 3 valves per station on inbuilt model.
- Total output load must not be exceeded by the valves and pump start requirements.
- Overload Protection: Standard 20mm 1.0 AMP fuse
- Power Failure: 9 volt standard alkaline battery permanently maintains programs.
- Power Failure: The controller has permanent memory so the data is always backed up even during power outages.
- Wiring: The output circuits should be installed and protected in accordance with wiring rules.

HOW TO SPECIFY

3604 Model Number

4 No. of Stations

MODELS

3712	12 station, 110 Volt internal transformer
3712-220	12 station, 220 Volt internal transformer
3718	18 station, 110 Volt internal transformer
3718-220	18 station, 220 Volt internal transformer
3724	24 station, 110 Volt internal transformer
3724-220	24 station, 220 Volt internal transformer

RPS 1224 IRRIGATION CONTROLLER
With 12, 18 and 24 stations, the RPS 1224 covers all your needs regardless of the size or complexity of the project at hand.

FEATURES/BENEFITS

- 12, 18 & 24 Station Models–Perfect for residential & light commercial applications.
- 8 fully Independent Programs–Allowing up to 8 starts per program. Maximum 64 starts per day.
- Indoor/Outdoor
- Water Conservative–Allows for quick adjustment of watering durations in 10% increments, from 10% to 200.
- Rain Sensor Ready–Accepts rain sensor and allows individual stations to be set and controlled by the sensor.
- Flexible Manual Operation–Automatic, semi-automatic and single station manual.
- System Test–Allows a full system check for valve operation.
- Permanent Memory–Saves programs during power outages.
- Weatherproof Enclosure–Ensures long product life.
- Two Year Limited Warranty.

SPECIFICATIONS

Operating Specifications

- Dimensions: HEIGHT: 9 ⅜"
  WIDTH: 10 ¼"
  DEPTH: 4 ⅛"
- Station Run Times: 1 min. to 12 hours 59 min.
- Programs: 8
- Start Times: 8 per program
- Water Schedule: 7 day calendar with individual day selection, or 1 to 15 day interval watering, or 365 day calendar for ODD/EVEN day watering.
- Rain Sensor Ready
- Inhibits automatic watering when wet conditions are detected by a suitable rain sensor.
- Two Master Valve/pump connections that can be enabled or disabled by station or by program.
- Automatic, semi-automatic & single station manual operation.
- Capable of programming remotely using a standard 9 Volt alkaline battery. Permanent memory saves programs during power outages.

Electrical Specifications

- Electrical Power Supply: 110-120 VAC/60Hz/230 VAC 50Hz
- Electrical Outputs: 24 Volts AC, 1.25 AMP
- To Solenoid Valve: 24 VAC 50/60 Hz 0.75 AMPs max. **Note:** up to 3 valves per station on inbuilt model.
- Total output load must not be exceeded by the valves and pump start requirements.
- Overload Protection: Standard 20mm 1.0 AMP fuse
- Power Failure: 9 volt standard alkaline battery permanently maintains programs.
- Power Failure: The controller has permanent memory so the data is always backed up even during power outages.
- Wiring: The output circuits should be installed and protected in accordance with wiring rules.

HOW TO SPECIFY

3712 — Model Number
12 — No. of Stations

2000 SERIES SINGLE STATION CONTROLLER

MODELS

2100 Single Station Controllers

2110	**Voltage** Input: 110 VAC, 60 Hz Output: 110 VAC, 60 Hz	**Rating** Single Pole, Single Throw Relay Rated for up to 1 H.P.
2112	**Voltage** Input: 110 VAC, 60 Hz Output: 110 VAC, 60 Hz	**Rating** Double Pole, Single Throw Relay Rated for up to 2 H.P.
2114	**Voltage** Input: 110 VAC, 60 Hz Output: 24 VAC, 30 VA	**Rating** Built-In Transformer
2116	**Voltage** Input: 110 VAC, 60 Hz Output: n/a	**Rating** Hydraulic 1/2 Gallon Pole, Single Throw
2120	**Voltage** Input: 220 VAC, 60 Hz Output: 220 VAC, 60 Hz	**Rating** Double Pole, Single Throw Relay Rated for up to 2 H.P.
2124	**Voltage** Input: 220 VAC, 60 Hz Output: 24 VAC, 20 VA	**Rating** Built-In Transformer

2500 Rainswitch-Ready Controllers

2510	**Voltage** Input: 110 VAC, 60 Hz Output: 110 VAC, 60 Hz	**Rating** Double Pole, Single Throw Relay Rated for up to 2 H.P.
2514	**Voltage** Input: 110 VAC, 60 Hz Output: 24 VAC, 30 VA	**Rating** Built-In Transformer
2520	**Voltage** Input: 220 VAC, 60 Hz Output: 220 VAC, 60 Hz	**Rating** Double Pole, Single Throw Relay Rated for up to 2 H.P.

2200 Short Duration Single Station Controllers

2210	**Voltage** Input: 110 VAC, 60 Hz Output: 110 VAC, 60 Hz	**Rating** Relay Rated for up to 1 H.P.
2214	**Voltage** Input: 110 VAC, 60 Hz Output: 24 VAC, 30 VA	**Rating** Built-In Transformer

K-RAIN SINGLE STATION CONTROLLERS

K-Rain's Single Station Controllers look great and stay safe with rain-tight, attractive enclosures.

FEATURES/BENEFITS

- 2100 models offer less hassle–24 hour programmable time dial with multiple start times and wide variety of timing periods including a "Skip-A-Day" 14 day program.
- UL Approved components.
- 2200 models are perfect for nursery and other mist applications–10 minute programmable dial, a wide variety of timing periods in multiples of 1.5, 3, and 6 seconds and multiple start times.
- 2500 models are prewired for easy connection of a rainswitch–Allows for manual override of rainswitch from controller face
- Convenience–2520 allows operation of 24 volt rainswitch and 2 H.P. 220 volt pump with same controller
- Two Year Limited Warranty.

HOW TO SPECIFY

2110

Model Number

PUMP START RELAY

The Pump Start Relay enclosure is constructed with a corrosion resistant, UV resistant and shockproof material. The rain-tight, secure, rustproof enclosure provides a safe and secure connection in a housing built to last.

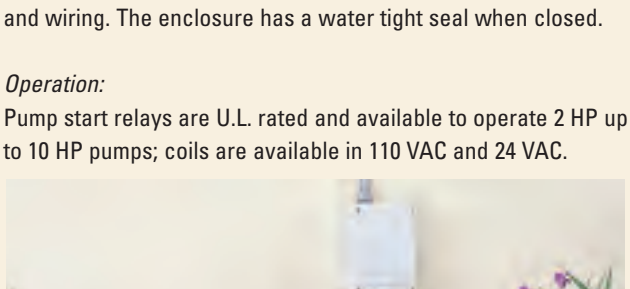
FEATURES/BENEFITS

- Industrial, Rain Tight, Secure, Rustproof Enclosure–Industrial-grade enclosure ensures long product life and deters tampering.
- U.L. Approved components.
- Large Easy Access Enclosure–Provides easy accessibility during wiring.
- Enclosure has 8 Recessed Knock-Outs–Provides easy connections from any direction.
- 110 VAC or 24 VAC Coils Available–Provides for a variety of applications up to 10 HP.
- Plastic Inset Cover Screws–Provides extra system security, reduces liability and deters tampering.
- Two Year Limited Warranty.

K-RAIN MODEL 1500: INDUSTRIAL PUMP START RELAYS

Construction:
Pump start relay enclosure is constructed with heavy duty corrosion resistant, UV resistant and shockproof material. The enclosure has four recessed screws in the front cover constructed from the same material as the enclosure. The enclosure has no less than 8 knockouts for easy access and wiring. The enclosure has a water tight seal when closed.

Operation:
Pump start relays are U.L. rated and available to operate 2 HP up to 10 HP pumps; coils are available in 110 VAC and 24 VAC.



MODELS

1510	**Coil Specifications** 120 VAC, 60 Hz Inrush: 35 VA Sealed: 7.0 VA Resistance: (±10%): 250 OHMS **Mini Coil** 24 VAC, 50/60 Hz Inrush: 52 mA Sealed: 1.2 VA Resistance: (±10%): 155 OHMS	Double Pole, Single Throw Inductive: 20 AMP Resistive: 30 AMP Input: 120 VAC - up to 2 H.P. UL Rated
1520	**Coil Specifications** 240 VAC, 60 Hz Inrush: 35 VA Sealed: 7.0 VA Resistance: (±10%): 1000 OHMS **Mini Coil** 24 VAC, 50/60 Hz Inrush: 52 mA Sealed: 1.2 VA Resistance: (±10%): 155 OHMS	Double Pole, Single Throw Inductive: 20 AMP Resistive: 30 AMP Input: 240 VAC - up to 3 H.P. UL Rated
1522	**Coil Specifications** 24 VAC, 60 Hz Inrush: 35 VA Sealed: 7.0 VA, 3 WATTS Resistance: (±10%): 11 OHMS	Double Pole, Single Throw Inductive: 20 AMP Resistive: 30 AMP Input: 120 VAC - up to 3 H.P. 240 VAC - up to 3 H.P.
1521	**Coil Specifications** 110 VAC, 60 Hz Inrush: 42 VA Sealed: 8.5 VA, 3.6 WATTS Resistance: (±10%): 210 OHMS	Double Pole, Single Throw Inductive: 20 AMP Resistive: 30 AMP Input: 120 VAC - up to 3 H.P. 240 VAC - up to 3 H.P.
1552	**Coil Specifications** 24 VAC, 60 Hz Inrush: 60 VA Sealed: 7 VA, 2.3 WATTS Resistance: (±10%): 5.61 OHMS	Double Pole, Single Throw Inductive: 40 AMP Resistive: 50 AMP Input: 120 VAC - up to 3 H.P. 240 VAC - up to 5 H.P.
1551	**Coil Specifications** 110 VAC, 60 Hz Inrush: 77 VA Sealed: 10 VA, 4 WATTS Resistance: (±10%): 89.5 OHMS	Double Pole, Single Throw Inductive: 40 AMP Resistive: 50 AMP Input: 120 VAC - up to 3 H.P. 240 VAC - up to 5 H.P.
1553	**Coil Specifications** 24 VAC, 60 Hz Inrush: 60 VA Sealed: 7 VA, 2.7 WATTS Resistance: (±10%): 5.61 OHMS	THREE PHASE OPERATION Triple Pole, Single Throw Inductive: 40 AMP Resistive: 50 AMP Input: 120 VAC - up to 3 H.P. 240 VAC - up to 10 H.P.

SPECIFICATIONS

- Dimensions: HEIGHT: 7"
  WIDTH: 5"
  DEPTH: 4-5/8"

HOW TO SPECIFY

1522
Model Number

4000 SERIES INDEXING VALVE

Four Outlet, 1 1/4" x 1-1/4" Models

4400	No Cam
4402	Cammed for 2 Zone Operation
4403	Cammed for 3 Zone Operation
4404	Cammed for 4 Zone Operation

Six Outlet, 1 1/4" x 1" Models

4600	No Cam
4602	Cammed for 2 Zone Operation
4603	Cammed for 3 Zone Operation
4604	Cammed for 4 Zone Operation
4605	Cammed for 5 Zone Operation
4606	Cammed for 6 Zone Operation

OTHER OPTIONS: ADD TO PART NUMBER

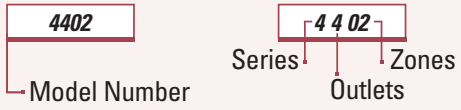
RCW	Reclaimed Water Use

4000 SERIES INDEXING VALVE

The 4000 offers a reliable, economical way to automate multiple zoned residential and small commercial irrigation systems.

FOR MORE INFORMATION ON RCW PRODUCTS, PLEASE SEE PAGES 36 AND 37.

HOW TO SPECIFY



FEATURES/BENEFITS

- ABS Polymer Construction–High-strength, non-corrosive body for long product life.
- Available in 4 and 6 Outlet Models–Can quickly and easily change from two to six watering zones.
- Simplicity of Design–Valves are easily maintained and serviced for long product life.
- Operates at Low 10 GPM at Pressures of 25-75 PSI– Reliably automates multiple zoned residential and small commercial irrigation or wastewater systems.
- Two Year Limited Warranty.

K-RAIN 4000 SERIES INDEXING VALVE

These patented indexing valves allow for the number of watering zones to be changed quickly and easily. They are ideally suited for both city water and pump applications and may also be used for onsite wastewater or effluent water applications. The simplicity of design and few moving parts ensures ease of maintenance and long service life.

The 4000 valve is available in 4 or 6 outlet models. A quick change of the cam allows the valve to operate from 2 to 6 zones. The valve will operate with flows as low as 10 GPM and at pressures of 25 to 75 PSI.

SPECIFICATIONS

- Constructed of High Strength, Non-Corrosive ABS Polymer
- Flow Range:
  4 Outlet Valve: 10-40 GPM
  6 Outlet Valve: 10-40 GPM
- Pressure Rating: 25 - 75 PSI
- Pressure Loss:

4 Outlet Valve:	Flow (GPM)	10	20	30	40
	PSI Loss	2.0	3.0	4.5	6.4
6 Outlet Valve:	Flow (GPM)	10	20	30	
	PSI Loss	2.5	4.5	7.5	

- 4000 Series Valves are available with 1" inlet and outlet by custom order.
- Dimensions:
  HEIGHT: 5-3/4"
  WIDTH: 5-3/4"

MODELS

Four Outlet Models

6402	Cammed for 2 Zone Operation
6403	Cammed for 3 Zone Operation
6404	Cammed for 4 Zone Operation

Six Outlet Models

6605	Cammed for 5 Zone Operation
6606	Cammed for 6 Zone Operation

OTHER OPTIONS: ADD TO PART NUMBER

RCW	Reclaimed Water Use

SPECIFICATIONS

- Construction:
  Valve Top/Housing: Die Cast Metal
  Valve Outlets: High Strength ABS Polymer
- Flow Range: 15-150 GPM
- Pressure Rating: 25 - 150 PSI
- Pressure Loss:

4 Outlet Valve:	Flow (GPM)	20	40	60	80	100
	PSI Loss	2.5	3.5	5.0	7.5	10.0
6 Outlet Valve:	Flow (GPM)	20	40	60	80	100
	PSI Loss	3.0	4.0	6.0	9.0	11.0

- Inlet: Threaded 1-1/2" NPT Connection
- Outlets: Slip and Glue Connections to 1-1/2" PVC Pipe
- Dimensions: HEIGHT: 7", WIDTH: 8"

6000 INDEXING VALVE

The 6000 line of indexing valves offers exceptional reliability and durability even under the dirtiest water conditions.

FOR MORE INFORMATION ON RCW PRODUCTS, PLEASE SEE PAGES 36 AND 37.

HOW TO SPECIFY

FEATURES/BENEFITS

- Metal Die-Cast Body–Durable, long lasting, and capable of high pressure applications.
- Available in 4 and 6 Outlet Models–Can quickly and easily change from two to six watering zones.
- Simplicity of Design–Valves are easily maintained and serviced for long product life.
- Operates at 15 GPM at Pressures of 25–150 PSI- Ideal for pump-fed systems or high-flow city water systems.
- Built-in Atmospheric Vacuum Breaker–Releases any vacuum created between the pump and the valve on shut down.
- Two Year Limited Warranty.

K-RAIN MODEL 6000: INDEXING VALVE

With a metal die-cast body, the 6000 valves are capable of high pressure applications and are recommended to be used on pump fed systems or high-flow city water systems. The 6000 is also ideal for onsite wastewater and effluent water applications.

The 6000 valve is available in 4 or 6 outlet models that are cammed for 2 to 6 zone operation. With only one moving part (the stem and disc assembly), the valve is easily serviced and maintained.

The valve requires 15 GPM to operate and works at pressures from 25 to 150 PSI.

K-RAIN ROTORS AND SPRAYS FOR RECLAIMED WATER

Worldwide regulations frequently require reclaimed water usage sites to use components identified with a purple cap or collar. K-rain manufactures an entire line of rotors, sprays and indexing valves to help you adhere to these rules.

The RCW series is designed specifically for use on reclaimed water systems. Flexibility in system design, achieved through a wide selection of nozzles, guarantees matched precipitation.

RCW models are available in the ProPlus and the K-Spray models. See relative pages for detailed specifications.

MODELS

K-RAIN K-SPRAY RCW SERIES

73001-RCW	3" Pop-Up
74001-RCW	4" Pop-Up
76001-RCW	6" Pop-Up
71201-RCW	12" Pop-Up

KRAIN PRO*PLUS* RCW

11003-RCW	Pro*Plus* for Reclaimed Water w/Low Angle Nozzle

FEATURES/BENEFITS

The ProPlus RCW Rotors

- Heavy Duty Rubber Cover (purple)–Seals out dirt and increases product durability, positively identifies the use of reclaimed water reducing liability.
- Five Year Limited Warranty.

The K-Sprays

- Using a low angle nozzle ensures the correct trajectory of reclaimed water.

PRO*PLUS*™ RCW

Tough, proven and advanced, the PRO*PLUS*™ is the leader in it's class. *Set it and forget it.* Arc Memory Clutch returns the rotor to its preset position.

K-SPRAY RCW

K-Spray pop-ups are ideal for watering smaller areas, ground cover or shrub areas.

MODELS

4000-RCW Four Outlet Models	
4400-RCW	No Cam
4402-RCW	Cammed for 2 Zone Operation
4403-RCW	Cammed for 3 Zone Operation
4404-RCW	Cammed for 4 Zone Operation
4000-RCW Six Outlet Models	
4600-RCW	No Cam
4602-RCW	Cammed for 2 Zone Operation
4603-RCW	Cammed for 3 Zone Operation
4604-RCW	Cammed for 4 Zone Operation
4605-RCW	Cammed for 5 Zone Operation
4606-RCW	Cammed for 6 Zone Operation
6000-RCW Four Outlet Models	
6402-RCW	Cammed for 2 Zone Operation
6403-RCW	Cammed for 3 Zone Operation
6404-RCW	Cammed for 4 Zone Operation
6000-RCW Six Outlet Models	
6605-RCW	Cammed for 5 Zone Operation
6606-RCW	Cammed for 6 Zone Operation

FEATURES/BENEFITS

- Available in 4 and 6 Outlet Models–Can quickly and easily change from two to six watering zones.
- Simplicity of Design–Valves are easily maintained and serviced for long product life.

The 4000 RCW Indexing Valve

- ABS Polymer Construction–High-strength, non-corrosive body for long product life.
- Operates at Low 10 GPM at Pressures of 25-75 PSI–Reliably automates multiple zoned residential and small commercial wastewater systems.

The 6000 RCW Indexing Valve

- Metal Die-Cast Body–Durable, long lasting, and capable of high pressure applications.
- Operates at 15 GPM at Pressures of 25-150 PSI–Ideal for onsite pump-fed wastewater and effluent water applications.
- Built-in Atmospheric Vacuum Breaker–Releases any vacuum created between the pump and the valve on shut down.
- Two Year Limited Warranty.

6000-RCW INDEXING VALVE
The 6000 line of indexing valves offers exceptional reliability and durability even under the dirtiest water conditions.

4000-RCW INDEXING VALVE
The 4000 offers a reliable, economical way to automate multiple zoned residential and small commercial irrigation systems.

K-RAIN INDEXING VALVES FOR RECLAIMED WATER

The 4000-RCW Indexing valve offers a reliable, economical way to automate multiple zoned residential and small commercial wastewater systems. The simplicity of design and a minimum of moving parts ensures ease of maintenance and long service life.

These patented valves allow for the number of watering zones to be changed quickly and easily. They are ideally suited for pump applications, onsite wastewater or effluent water applications.

The 6000-RCW Indexing valve offers exceptional reliability and durability even under the dirtiest water conditions. With a metal die-cast body, the 6000-RCW valves are capable of high pressure applications and are recommended to be used on pump fed systems. The 6000-RCW series is ideal for onsite wastewater and effluent water applications.

CONVERSION TABLE FOR U.S. AND METRIC SYSTEMS

METRIC TO U.S.

MULTIPLY				TO OBTAIN
Millimeters (mm)	x	.03937	=	inches
Centimeters (cm)	x	.3937	=	inches
Meters (m)	x	39.37	=	inches
Meters (m)	x	3.281	=	feet
Meters (m)	x	1.094	=	yards
Kilometers (km)	x	.62137	=	miles
Kilometers (km)	x	1093.62	=	yards
Kilometers (km)	x	3280.87	=	feet
Liters (l)	x	1.0567	=	quarts (liq.)
Liters (l)	x	.2642	=	gallons (U.S.)
Liters (l)	x	.455	=	pounds
Temp. in (Cº x 1.80)	+	32º	=	temp. in Fº

U.S. TO METRIC

MULTIPLY				TO OBTAIN
Inches (in.)	x	25.4	=	millimeters
Inches (in.)	x	2.54	=	centimeters
Inches (in.)	x	.0254	=	meters
Feet (ft.)	x	.3048	=	meters
Yards (yds.)	x	.9144	=	meters
Miles (mi.)	x	1.6093	=	kilometers
Yards (yds.)	x	.0009143	=	kilometers
Feet (ft.)	x	.0003048	=	kilometers
Quarts (qts.)	x	.945	=	liters
Gallons	x	3.78	=	liters
Pounds	x	2.2	=	liters
Temp. in Fº - 32º	x	.5666	=	temp. in Cº

Kilograms per cubic centimeter (kg/cm²)	**x**	**14.223**	**=**	**Pounds per square inch (P.S.I.)**
Cubic Foot (cu. ft.) x 28.316			**=**	**Liters (1.)**

MISCELLANEOUS CONVERSION FACTORS

Feet head (ft. hd.) x .433	=	Pounds per square inch (P.S.I.)		Calorie x 3.968	=	British Thermal Unit (B.T.U.)	
Pounds per square inch x 2.31	=	Feet head		Foot pounds per second x .7373	=	Watts	
Meters x 3.28	=	Feet head		Kilowatts x 1.34	=	Horsepower	
Inches of mercury x1.133	=	Feet head		Square foot x 144	=	Square inches	
U.S. gallons per minute x .1337	=	Cubic feet per minute		Square yard x 9	=	Square feet	
Cubic feet per minute x 7.48	=	U.S. gallons per minute		Acre x 4.840	=	Square yards	
British Imperial gallon x 1.201	=	U.S. gallons		Acre x 43,560	=	Square feet	
Acre inches per hour x 453	=	G.P.M.		Square mile (section) x 640	=	Acres	
Acre foot per day x226	=	G.P.M.		Mile x 5280	=	Feet	
1,000,000 gallons per day	=	694 G.P.M.		Cubic yard x 27	=	Cubic Feet	
U.S. gallons x .833	=	British Imperial gallon		Circumference of circe x .3183	=	Diameter of circle	
U.S. gallon x 8.336	=	Pounds		Diameter of circe x 3.1416	=	Circumference of circle	
Acre foot x 325,850	=	U.S. gallons		Diameter of circle squared x .7854	=	Area of circle	
Gallons per day x 1,000,000	=	694 gallons per minute		Radius of circle squared x 3.1416	=	Area of circle	
U.S. gallons x 231	=	Cubic inches		Cubic Feet per second x 448.8	=	U.S. gallons per minute	
Horsepower (H.P.) x 746	=	Watts		Cubic feet per second	=	Gallons per minute - 449	
Horsepower x .746	=	Kilowatts		Velocity in feet per second	=	$\frac{.408 \times \text{U.S. g.p.m.}}{\text{Diam. of pipe squared}}$ or $\frac{144Q \text{ (flow in G.P.M.)}}{A1 \text{ (Pipe ID2)}}$	

RESISTANCE METHOD

Required Information

- Actual one-way length of wire between the controllers and at the power source of the controllers and valves
- Allowable voltage loss along the wire circuit
- Accumulative current flowing through the wire section being sized in amperes

Resistance is calculated using formula:

$$R = \frac{1000 \times AVL}{2L \times I}$$

R = Maximum Allowable Resistance of wire in ohms per 1000 feet

AVL= Allowable voltage loss

L= Wire length (one way)

I= Inrush current

AVL for controller power wire sizing is calculated by subtracting the minimum operating voltage required by the controller from the minimum available voltage at the power source.

AVL for valve wire sizing is calculated by subtracting minimum solenoid operating voltage from controller output voltage. This number will vary depending on the manufacturer and in some cases with line pressure.

VALVE WIRE SIZING EXAMPLE:

Given: The distance from the controller to the valve is 1800 ft. The controller output is 24V. The valve has a minimum operating voltage of 20V and an inrush current of 370 mA (0.37Amps).

$$R = \frac{1000 \times 4}{2(1800) \times 0.37}$$

$$R = \frac{4000}{1332}$$

R = 3.00 ohms/1000 feet

Wire resistance can not exceed 3.00 ohms per 1000 feet. Go to table #1 and select the proper wire size. Since 16 gauge wire has more resistance that 3.00 ohms per 1000 feet, choose 14 gauge wire.

Table 2 is a quick reference and is set up to provide maximum wire runs given the information at the bottom of the table.

TABLE 1
Resistance of Copper Wire

WIRE SIZE AWG No.	Resistance at 20° C (68° F) ohms per 1000 Feet
18	6.39
16	4.02
14	2.52
12	1.59
10	1.00
8	0.63
6	0.40
4	0.25

TABLE 2
Valve Wire Sizing (Maximum One-Way Distance in Feet Between Controller and Valve)

GROUND WIRE	CONTROL WIRE						
	18	16	14	12	10	8	6
18	850	1040	1210	1350	1460	1540	1590
16	1040	1340	1650	1920	2150	2330	2440
14	1210	1650	2150	2630	3080	3450	3700
12	1350	1920	2630	3390	4170	4880	5400
10	1460	2150	3080	4170	5400	6670	7690
8	1540	2330	3450	4880	6670	8700	10530
6	1590	2440	3700	5400	7690	10530	13330

Solenoid: 24VAC, Pressure: 150 PSI, Voltage Drop: 4V, Min. Operating Voltage: 20V, Amperage Peak: .37A

FORMULAS

PRECIPITATION RATES	(U.S.)		(METRIC)	
Equilateral Triangular Spacing	P.R.= (in/hr)	(GPM of 360) x 96.25 / (Head Spacing)² x .866	P.R.= (mm/hr)	m3/hr of 360 x 1000 / m2 x .866
Square/Rectangular Spacing	P.R.= (in/hr)	(GPM of 360) x 96.25 / head Spacing x Row Spacing	P.R.= (mm/hr)	m3/hr of 360 x 1000 / Degrees of Arc x Head Spacing
Square/Rectangular Spacing for Specific Arc	P.R.= (in/hr)	3460 x GPM (for any arc) / Degrees of Arc x Head Spacing x Row Spacing	P.R.= (mm/hr)	m3/hr (for any arc) x 1000 / Degrees of Arc x Head Spacing x Row Spacing
Horsepower	H.P. =	GPM x Ft of Head / 3,960 x Pump Efficiency (expressed as a decimal)		
Station Run Time	S.R.T. = (min/wk)	Total Weekly Req'd (inch/wk) x 60 (min/hr) / Precipitation Rate (in/hr)	S.R.T.= (min/wk)	Total Weekly Req'd (mm/wk) x 60 (min/hr) / Precipitation Rate (mm/hr)
Pipe Velocity	V= (ft/sec)	0.4085 x Flow (GPM) / (Inside Pipe Diameter in Inches)²	V= (m/sec)	1273.24 x Fl0flow (l/sec) / (Inside Pipe Diameter in Millimeters)²
Scheduling Coefficient	S.C.=	Average Precipitation Rate (in/hr) / Lowest PRecipitation Rate (in/hr)	S.C.=	Average Precipitation Rate (mm/hr) / Lowest Precipitation Rate (mm/hr)
Slope	S=	Rise (Measure of Length) / Run (Measure of Length)		

PVC SCHEDULE 40 IPS PLASTIC PIPE

Sizes 1/2" thru 6"
Flow GPM 1 thru 600

(1120, 1220) C = 150
PSI loss per 100 feet of tube (PSI/100 FT)

SIZE	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
OD	0.840		1.050		1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
ID	0.622		0.824		1.049		1.380		1.610		2.067		2.469		3.068		4.026		6.065	
WALL THK.	0.109		0.113		0.133		0.140		0.145		0.154		0.203		0.216		0.237		0.280	
FLOW G. P. M.	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss
1	1.05	0.43	0.60	0.11	0.37	0.03	0.21	0.01	0.15	0.00										
2	2.11	1.55	1.20	0.39	0.74	0.12	0.42	0.03	0.31	0.02	0.19	0.00								
3	3.16	3.28	1.80	0.84	1.11	0.26	0.64	0.07	0.47	0.03	0.28	0.01	0.20	0.00						
4	4.22	5.60	2.40	1.42	1.48	0.44	0.85	0.12	0.62	0.05	0.38	0.02	0.26	0.01						
5	5.27	8.46	3.00	2.15	1.85	0.66	1.07	0.18	0.78	0.08	0.47	0.02	0.33	0.01	0.21	0.00				
6	6.33	11.86	3.60	3.02	2.22	0.93	1.28	0.25	0.94	0.12	0.57	0.03	0.40	0.01	0.26	0.01				
7	7.38	15.77	4.20	4.01	2.59	1.24	1.49	0.33	1.10	0.15	0.66	0.05	0.46	0.02	0.30	0.01				
8	8.44	20.20	4.80	5.14	2.96	1.59	1.71	0.42	1.25	0.20	0.76	0.06	0.53	0.02	0.34	0.01				
9	9.49	25.12	5.40	6.39	3.33	1.97	1.92	0.52	1.41	0.25	0.85	0.07	0.60	0.03	0.39	0.01				
10	10.55	30.54	6.00	7.77	3.70	2.40	2.14	0.63	1.57	0.30	0.95	0.09	0.66	0.04	0.43	0.01				
11	11.60	36.43	6.60	9.27	4.07	2.86	2.35	0.75	1.73	0.36	1.05	0.11	0.73	0.04	0.47	0.02				
12	12.65	42.80	7.21	10.89	4.44	3.36	2.57	0.89	1.88	0.42	1.14	0.12	0.80	0.05	0.52	0.02	0.30	0.00		
14	14.76	56.94	8.41	14.48	5.19	4.47	2.99	1.18	2.20	0.56	1.33	0.17	0.93	0.07	0.60	0.02	0.35	0.01		
16	16.87	72.92	9.61	18.55	5.93	5.73	3.42	1.51	2.51	0.71	1.52	0.21	1.07	0.09	0.69	0.03	0.40	0.01		
18	18.98	90.69	10.81	23.07	6.67	7.13	3.85	1.88	2.83	0.89	1.71	0.26	1.20	0.11	0.78	0.04	0.45	0.01		
20	21.09	110.23	12.01	28.04	7.41	8.66	4.28	2.28	3.14	1.08	1.90	0.32	1.33	0.13	0.86	0.05	0.50	0.01		
22			13.21	33.45	8.15	10.33	4.71	2.72	3.46	1.29	2.10	0.38	1.47	0.16	0.95	0.06	0.55	0.01		
24			14.42	39.30	8.89	12.14	5.14	3.20	3.77	1.51	2.29	0.45	1.60	0.19	1.04	0.07	0.60	0.02		
26			15.62	45.58	9.64	14.08	5.57	3.17	4.09	1.75	2.48	0.52	1.74	0.22	1.12	0.08	0.65	0.02		
28			16.82	52.28	10.38	16.15	5.99	4.25	4.40	2.01	2.67	0.60	1.87	0.25	1.21	0.09	0.70	0.02		
30			18.02	59.41	11.12	18.35	6.42	4.83	4.72	2.28	2.86	0.68	2.00	0.29	1.30	0.10	0.75	0.03		
35					12.97	24.42	7.49	6.43	5.50	3.04	3.34	0.90	2.34	0.38	1.51	0.13	0.88	0.04	0.38	0.00
40					14.83	31.27	8.56	8.23	6.29	3.89	3.81	1.15	2.67	0.49	1.73	0.17	1.00	0.04	0.44	0.01
45					16.68	38.89	9.64	10.24	7.08	4.84	4.29	1.43	3.01	0.60	1.95	0.21	1.13	0.06	0.49	0.01
50					18.53	47.27	10.71	12.45	7.87	5.88	4.77	1.74	3.34	0.73	2.16	0.26	1.25	0.07	1.55	0.01
55							11.78	14.85	8.65	7.01	5.25	2.08	3.68	0.88	2.38	0.30	1.38	0.08	0.61	0.01
60							12.85	17.45	9.44	8.24	5.72	2.44	4.01	1.03	2.60	0.36	1.51	0.10	0.66	0.01
65							13.92	20.23	10.23	9.56	6.20	2.83	4.35	1.19	2.81	0.41	1.63	0.11	0.72	0.02
70							14.99	23.21	11.01	10.96	6.68	3.25	4.68	1.37	3.03	0.48	1.76	0.13	0.77	0.02
75							16.06	26.37	11.80	12.46	7.16	3.69	5.01	1.56	3.25	0.54	1.88	0.14	0.83	0.02
80							17.13	29.72	12.59	14.04	7.63	4.16	5.35	1.75	3.46	0.61	2.01	0.16	0.88	0.02
85							18.21	33.26	13.37	15.71	8.11	4.66	5.68	1.96	3.68	0.68	2.13	0.18	0.94	0.02
90							19.28	36.97	14.16	17.46	8.59	5.18	6.02	2.18	3.90	0.76	2.26	0.20	0.99	0.03
95									14.95	19.30	9.07	5.72	6.35	2.41	4.11	0.84	2.39	0.22	1.05	0.03
100									15.74	21.22	9.54	6.29	6.69	2.65	4.33	0.92	2.51	0.25	1.10	0.03
110									17.31	25.32	10.50	7.51	7.36	3.16	4.76	1.10	2.76	0.29	1.22	0.04
120									18.88	29.75	11.45	8.82	8.03	3.72	5.20	1.29	3.02	0.34	1.33	0.05
130											12.41	10.23	8.70	4.31	5.63	1.50	3.27	0.40	1.44	0.05
140											13.36	11.74	9.37	4.94	6.06	1.72	3.52	0.46	1.55	0.06
150											14.32	13.33	10.03	5.62	6.50	1.95	3.77	0.52	1.66	0.07
160											15.27	15.03	10.70	6.33	6.93	2.20	4.02	0.59	1.77	0.08
170											16.23	16.81	11.37	7.08	7.36	2.46	4.27	0.66	1.88	0.09
180											17.18	18.69	12.04	7.87	7.80	2.74	4.53	0.73	1.99	0.10
190											18.14	20.66	12.71	8.70	8.23	3.02	4.78	0.81	2.10	0.11
200											19.09	22.72	13.38	9.57	8.66	3.33	5.03	0.89	2.21	0.12
225													15.05	11.90	9.75	4.14	5.66	1.10	2.49	0.15
250													16.73	14.47	10.83	5.03	6.29	1.34	2.77	0.18
275													18.40	17.26	11.92	6.00	6.92	1.60	3.05	0.22
300															13.00	7.05	7.55	1.88	3.32	0.26
325															14.08	8.17	8.18	2.18	3.60	0.30
350															15.17	9.38	8.81	2.50	3.88	0.34
375															16.25	10.65	9.43	2.84	4.15	0.39
400															17.33	12.01	10.06	3.20	4.43	0.44
425															18.42	13.43	10.69	3.58	4.71	0.49
450															19.50	14.93	11.32	3.98	4.99	0.54
475																	11.95	4.40	5.26	0.60
500																	12.58	4.84	5.54	0.66
550																	13.84	5.77	6.10	0.79
600																	15.10	6.78	6.65	0.92

Note: Shaded areas of the chart indicate velocities over 5 feet per second (FPS). **Use with caution.**

PVC SCHEDULE 80 IPS PLASTIC PIPE

Sizes 1/2" thru 6" (1120, 1220) C = 150

Flow GPM 1 thru 600 PSI loss per 100 feet of tube (PSI/100 FT)

SIZE	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
OD	0.840		1.050		1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
ID	0.546		0.742		0.957		1.278		1.500		1.939		2.323		2.900		3.826		5.761	
WALL THK.	0.147		0.154		0.179		0.191		0.200		0.218		0.276		0.300		0.337		0.432	
FLOW G. P. M.	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss
1	1.36	0.81	0.74	0.18	0.44	0.05	0.24	0.01	0.18	0.01	0.10	0.00								
2	2.73	2.92	1.48	0.66	0.89	0.19	0.49	0.05	0.36	0.02	0.21	0.01	0.15	0.00						
3	4.10	6.19	2.22	1.39	1.33	0.40	0.74	0.10	0.54	0.05	0.32	0.01	0.22	0.01						
4	5.47	10.54	2.96	2.37	1.78	0.69	0.99	0.17	0.72	0.08	0.43	0.02	0.30	0.01						
5	6.84	15.93	3.70	3.58	2.22	1.04	1.24	0.25	0.90	0.12	0.54	0.03	0.37	0.01	0.24	0.00				
6	8.21	22.33	4.44	5.02	2.67	1.46	1.49	0.36	1.08	0.16	0.65	0.05	0.45	0.02	0.29	0.01				
7	9.58	29.71	5.18	6.68	3.11	1.94	1.74	0.47	1.26	0.22	0.75	0.06	0.52	0.03	0.33	0.01				
8	10.94	38.05	5.92	8.56	3.56	2.48	1.99	0.61	1.45	0.28	0.86	0.08	0.60	0.03	0.38	0.01				
9	12.31	47.33	6.66	10.64	4.00	3.09	2.24	0.76	1.63	0.35	0.97	0.10	0.68	0.04	0.43	0.01				
10	13.68	57.52	7.41	12.93	4.45	3.75	2.49	0.92	1.81	0.42	1.08	0.12	0.75	0.05	0.48	0.02	0.27	0.00		
11	15.05	68.63	8.15	15.43	4.90	4.47	2.74	1.10	1.99	0.50	1.19	0.14	0.83	0.06	0.53	0.02	0.30	0.01		
12	16.42	80.63	8.89	18.13	5.34	5.26	2.99	1.29	2.17	0.59	1.30	0.17	0.90	0.07	0.58	0.02	0.33	0.01		
14			10.37	24.12	6.23	6.99	3.49	1.71	2.53	0.79	1.51	0.23	1.05	0.09	0.67	0.03	0.39	0.01		
16			11.85	30.88	7.12	8.95	3.99	2.19	2.90	1.01	1.73	0.29	1.20	1.12	0.77	0.04	0.44	0.01		
18			13.33	38.41	8.01	11.14	4.49	2.73	3.26	1.26	1.95	0.36	1.36	0.15	0.87	0.05	0.50	0.01		
20			14.82	46.69	8.90	13.54	4.99	3.31	3.62	1.52	2.17	0.44	1.51	0.18	0.97	0.06	0.55	0.02		
22			16.30	55.70	9.80	16.15	5.49	3.95	3.98	1.81	2.38	0.52	1.66	0.22	1.06	0.07	0.61	0.02		
24			17.78	65.44	10.69	18.97	5.99	4.64	4.35	2.13	2.60	0.61	1.81	0.25	1.16	0.09	0.66	0.02		
26			19.26	75.90	11.58	22.01	6.49	5.39	4.71	2.47	2.82	0.71	1.96	0.29	1.26	0.10	0.72	0.03		
28					12.47	25.24	6.99	6.18	5.07	2.83	3.03	0.81	2.11	0.34	1.35	0.11	0.78	0.03		
30					13.36	28.69	7.49	7.02	5.43	3.22	3.25	0.92	2.26	0.38	1.45	0.13	0.83	0.03	0.36	0.00
35					15.59	38.16	8.74	9.34	6.34	4.29	3.79	1.23	2.64	0.51	1.69	0.17	0.97	0.05	0.43	0.01
40					17.81	48.87	9.99	11. 96	7.25	5.49	4.34	1.57	3.02	0.65	1.94	0.22	1.11	0.06	0.49	0.01
45							11.24	14.88	8.16	6.83	4.88	1.96	3.40	0.81	2.18	0.28	1.25	0.07	0.55	0.01
50							12.49	18.09	9.06	8.30	5.42	2.38	3.78	0.99	2.42	0.34	1.39	0.09	0.61	0.01
55							13.73	21.58	9.97	9.90	5.96	2.84	4.15	1.18	2.66	0.40	1.53	0.10	0.67	0.01
60							14.98	25.35	10.87	11.63	6.51	3.33	4.53	1.38	2.91	0.47	1.67	0.12	0.73	0.02
65							16.23	29.40	11.78	13.49	7.05	3.87	4.91	1.61	3.15	0.55	1.81	0.14	0.79	0.02
70							17.48	33.72	12.69	15.47	7.59	4.44	5.29	1.84	3.39	0.63	1.95	0.16	0.86	0.02
75							18.73	38.32	13.59	17.58	8.13	5.04	5.67	2.09	3.63	0.71	2.09	0.18	0.92	0.03
80							19.98	43.19	14.50	19.81	8.68	5.68	6.04	2.36	3.88	0.80	2.22	0.21	0.98	0.03
85									15.41	22.16	9.22	6.36	6.42	2.63	4.12	0.90	2.36	0.23	1.04	0.03
90									16.32	24.64	9.76	7.07	6.80	2.93	4.36	1.00	2.50	0.26	1.10	0.04
95									17.22	27.23	10.30	7.81	7.18	3.24	4.60	1.10	2.64	0.29	1.16	0.04
100									18.13	29.95	10.85	8.59	7.56	3.57	4.85	1.21	2.78	0.31	1.22	0.04
110									19.94	35.73	11. 93	10.25	8.31	4.25	5.33	1.45	3.06	0.38	1.35	0.05
120											13.02	12.04	9.07	5.00	5.82	1.70	3.34	0.44	1.47	0.06
130											14.10	13.96	9.82	5.60	6.30	1.97	3.62	0.51	1.59	0.07
140											15.19	16.02	10.58	6.65	6.79	2.27	3.90	0.59	1.72	0.08
150											16.27	18.20	11.34	7.56	7.27	2.57	4.18	0.67	1.84	0.09
160											17.36	20.51	12.09	8.51	7.76	2.89	4.45	0.75	1.96	0.10
170											18.44	22.95	12.85	9.53	8.24	3.24	4.73	0.84	2.08	0.11
180											19.53	25.51	13.60	10.59	8.73	3.60	5.01	0.93	2.21	0.13
190													14.36	11.71	9.21	3.98	5.29	1.03	2.33	0.14
200													15.12	12.87	9.70	4.37	5.57	1.14	2.45	0.16
225													17.01	16.01	10.91	5.44	6.27	1.41	2.76	0.19
250													18.90	19.46	12.12	6.61	6.96	1.72	3.07	0.23
275															13.34	7.89	7.66	2.05	3.38	0.28
300															14.55	9.27	8.36	2.41	3.68	0.33
325															15.76	10.75	9.05	2.79	3.99	0.38
350															16.97	12.33	9.75	3.20	4.30	0.44
375															18.19	14.01	10.45	3.64	4.60	0.50
400															19.40	15.79	11.14	4.10	4.91	0.56
425																	11.84	4.59	5.22	0.63
450																	12.54	5.10	5.53	0.70
475																	13.23	5.64	5.83	0.77
500																	13.93	6.20	6.14	0.85
550																	15.32	7.40	6.76	1.01
600																	16.72	8.69	7.37	1.19

Note: Shaded areas of the chart indicate velocities over 5 feet per second (FPS). **Use with caution.**

Velocity of flow rate values are computed from the general equation $V = .408\ Q/d^2$

Friction pressure loss values are computed from the equation $\left[hf = 0.2083\ (100/C)\ 1.852\ Q^{1.852}/d^{4.866}\right]$ x .433 for psi loss per 100' of pipe.

PVC CLASS 125 IPS PLASTIC PIPE

Sizes 1" thru 6" (1120, 1220) SDR 32.5 C = 150

Flow GPM 1 thru 600 PSI loss per 100 feet of tube (PSI/100 FT)

SIZE	1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
OD	1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
ID	1.211		1.548		1.784		2.229		2.699		3.284		4.224		6.217	
WALL THK.	0.052		0.056		0.058		0.073		0.088		0.108		0.138		0.204	
FLOW G. P. M.	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss
1	0.27	0.02	0.17	0.01	0.12	0.00										
2	0.55	0.06	0.34	0.02	0.25	0.01	0.16	0.00								
3	0.83	0.13	0.51	0.04	0.38	0.02	0.24	0.01								
4	1.11	0.22	0.68	0.07	0.51	0.03	0.32	0.01	0.22	0.00						
5	1.39	0.33	0.85	0.10	0.64	0.05	0.41	0.02	0.28	0.01						
6	1.66	0.46	1.02	0.14	0.76	0.07	0.49	0.02	0.33	0.01						
7	1.94	0.62	1.19	0.19	0.89	0.09	0.57	0.03	0.39	0.01	0.26	0.00				
8	2.22	0.79	1.36	0.24	1.02	0.12	0.65	0.04	0.44	0.02	0.30	0.01				
9	2.50	0.98	1.53	0.30	1.15	0.15	0.73	0.05	0.50	0.02	0.34	0.01				
10	2.78	1.19	1.70	0.36	1.28	0.18	0.82	0.06	0.56	0.02	0.37	0.01				
11	3.06	1.42	1.87	0.43	1.41	0.22	0.90	0.07	0.61	0.03	0.41	0.01				
12	3.33	1.67	2.04	0.51	1.53	0.25	0.98	0.09	0.67	0.03	0.45	0.01	0.27	0.00		
14	3.89	2.22	2.38	0.67	1.79	0.34	1.14	0.11	0.78	0.05	0.52	0.02	0.32	0.01		
16	4.45	2.85	2.72	0.86	2.05	0.43	1.31	0.15	0.89	0.06	0.60	0.02	0.36	0.01		
18	5.00	3.54	3.06	1.07	2.30	0.54	1.47	0.18	1.00	0.07	0.68	0.03	0.41	0.01		
20	5.56	4.31	3.40	1.30	2.56	0.65	1.64	0.22	1.12	0.09	0.75	0.03	0.45	0.01		
22	6.12	5.14	3.74	1.56	2.82	0.78	1.80	0.26	1.23	0.10	0.83	0.04	0.50	0.01		
24	6.67	6.04	4.08	1.83	3.07	0.92	1.97	0.31	1.34	0.12	0.90	0.05	0.54	0.01		
26	7.23	7.00	4.42	2.12	3.33	1.06	2.13	0.36	1.45	0.14	0.98	0.05	0.59	0.02		
28	7.78	8.03	4.76	2.43	3.58	1.22	2.29	0.41	1.56	0.16	1.05	0.06	0.644	0.02		
30	8.34	9.13	5.10	2.76	3.84	1.39	2.46	0.47	1.68	0.18	1.13	0.07	0.68	0.02		
35	9.73	12.14	5.95	3.68	4.48	1.84	2.87	0.62	1.96	0.25	1.32	0.09	0.80	0.03	0.36	0.00
40	11.12	15.55	6.81	4.71	5.12	2.36	3.28	0.80	2.24	0.31	1.51	0.12	0.91	0.04	0.42	0.01
45	12.51	19.34	7.66	5.86	5.76	2.94	3.69	0.99	2.52	0.39	1.70	0.15	1.02	0.04	0.47	0.01
50	13.91	23.50	8.51	7.12	6.40	3.57	4.10	1.21	2.80	0.48	1.89	0.18	1.14	0.05	0.52	0.01
55	15.30	28.04	9.36	8.49	7.05	4.26	4.51	1.44	3.08	0.57	2.08	0.22	1.25	0.06	0.58	0.01
60	16.69	32.94	10.21	9.98	7.69	5.00	4.92	1.69	3.36	0.67	2.26	0.26	1.37	0.085	0.63	0.01
65	18.08	38.21	11.06	11.57	8.33	5.80	5.33	1.96	3.64	0.77	2.45	0.30	1.48	0.09	0.68	0.01
70	19.47	43.83	11.91	13.27	8.97	6.65	5.74	2.25	3.92	0.89	2.64	0.34	1.60	0.10	0.73	0.02
75			12.76	15.08	9.61	7.56	6.15	2.56	4.20	1.01	2.83	0.39	1.71	0.11	0.79	0.02
80			13.62	17.00	10.25	8.52	6.56	2.88	4.48	1.14	3.02	0.44	1.82	0.13	0.84	0.02
85			14.47	19.02	10.89	9.53	6.98	3.23	4.76	1.27	3.21	0.49	1.94	0.14	0.89	0.02
90			15.32	21.14	11.53	10.60	7.39	3.59	5.04	1.41	3.40	0.54	2.05	0.16	0.95	0.02
95			16.17	23.37	12.17	11.71	7.80	3.96	5.32	1.56	3.59	0.60	2.17	0.18	1.00	0.03
100			17.02	25.69	12.81	12.88	8.21	4.36	5.60	1.72	3.78	0.66	2.28	0.19	1.05	0.03
110			18.72	3.65	14.10	15.37	9.03	5.20	6.16	2.05	4.16	0.79	2.51	0.23	1.16	0.04
120					15.38	18.06	9.85	6.11	6.72	2.41	4.53	0.93	2.74	0.27	1.26	0.04
130					16.66	20.94	10.67	7.09	7.28	2.79	4.91	1.08	2.97	0.32	1.37	0.05
140					17.94	24.02	11.49	8.13	7.84	3.20	5.29	1.23	3.20	0.36	1.47	0.06
150					19.22	27.30	12.31	9.24	8.40	3.64	5.67	1.40	3.43	0.41	1.58	0.06
160							13.13	10.41	8.96	4.10	6.05	1.58	3.65	0.46	1.68	0.07
170							13.96	11.65	9.52	4.59	6.43	1.77	3.88	0.52	1.79	0.08
180							14.78	12.95	10.08	5.10	6.80	1.96	4.11	0.58	1.90	0.09
190							15.60	14.31	10.64	5.64	7.18	2.17	4.34	0.64	2.00	0.10
200							16.42	15.74	11.20	6.20	7.56	2.39	4.57	0.70	2.11	0.11
225							18.47	19.57	12.60	7.72	8.51	2.97	5.14	0.87	2.37	0.13
250									14.00	9.38	9.45	3.61	5.71	1.06	2.63	0.16
275									15.40	11.19	10.40	4.31	6.28	1.27	2.90	0.19
300									16.80	13.15	11.34	5.06	6.86	1.49	3.16	0.23
325									18.20	15.25	12.29	5.87	7.43	1.72	3.43	0.26
350									19.60	17.49	13.24	6.73	8.00	1.98	3.69	0.30
375											14.18	7.65	8.57	2.25	3.95	0.34
400											15.13	8.62	9.14	2.53	4.22	0.39
425											16.07	9.65	9.71	2.83	4.48	0.43
450											17.02	10.72	10.29	3.15	4.75	0.48
475											17.96	11.85	10.86	3.48	5.01	0.53
500											18.91	13.03	11.43	3.83	5.27	0.58
550													12.57	4.57	5.80	0.70
600													13.72	5.37	6.33	0.82

Note: Shaded areas of the chart indicate velocities over 5 feet per second (FPS). **Use with caution.**

PVC CLASS 160 IPS PLASTIC PIPE

Sizes 1" thru 6" (1120, 1220) SDR 26 C = 150
Flow GPM 1 thru 600 PSI loss per 100 feet of tube (PSI/100 FT)

SIZE	1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
OD	1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
ID	1.195		1.532		1.754		2.193		2.655		3.230		4.154		6.115	
WALL THK.	0.060		0.064		0.073		0.091		0.110		0.135		0.173		0.225	
FLOW G. P. M.	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss
1	0.28	0.02	0.17	0.01	0.13	0.00										
2	0.57	0.06	0.34	0.02	0.26	0.01	0.16	0.00								
3	0.85	0.14	0.52	0.04	0.39	0.02	0.25	0.01								
4	1.14	0.23	0.69	0.07	0.53	0.04	0.33	0.01	0.23	0.00						
5	1.42	0.35	0.86	0.11	0.66	0.05	0.42	0.02	0.28	0.01						
6	1.71	0.49	1.04	0.15	0.79	0.08	0.50	0.03	0.34	0.01	0.20	0.00				
7	1.99	0.66	1.21	0.20	0.92	0.10	0.59	0.03	0.40	0.01	0.27	0.01				
8	2.28	0.84	1.39	0.25	1.06	0.13	0.67	0.04	0.46	0.02	0.31	0.01				
9	2.57	1.05	1.56	0.31	1.19	0.16	0.76	0.05	0.52	0.02	0.35	0.01				
10	2.85	1.27	1.73	0.38	1.32	0.20	0.84	0.07	0.57	0.03	0.39	0.01				
11	3.14	1.52	1.91	0.45	1.45	0.23	0.93	0.08	0.63	0.03	0.43	0.01				
12	3.42	1.78	2.085	0.53	1.59	0.28	1.01	0.09	0.69	0.04	0.46	0.01	0.28	0.00		
14	3.99	2.37	2.43	0.71	1.85	0.37	1.18	0.12	0.81	0.05	0.54	0.02	0.33	0.01		
16	4.57	3.04	2.78	0.91	2.12	0.47	1.35	0.16	0.92	0.06	0.62	0.02	0.37	0.01		
18	5.14	3.78	3.12	1.13	2.38	0.58	1.52	0.20	1.04	0.08	0.70	0.03	0.42	0.01		
20	5.71	4.59	3.47	1.37	2.65	0.71	1.69	0.24	1.15	0.09	0.78	0.04	0.47	0.01		
22	6.28	5.48	3.82	1.64	2.91	0.85	1.86	0.29	1.27	0.11	0.86	0.04	0.52	0.01		
24	6.85	6.44	4.17	1.92	3.18	1.00	2.03	0.34	1.38	0.13	0.93	0.05	0.56	0.02		
26	7.42	7.47	4.51	2.23	3.44	1.15	2.20	0.39	1.50	0.15	1.01	0.06	0.61	0.02		
28	7.99	8.57	4.86	2.56	3.71	1.32	2.37	0.45	1.62	0.18	1.09	0.07	0.66	0.02		
30	8.57	9.74	5.21	2.91	3.97	1.50	2.54	0.51	1.73	0.20	1.17	0.08	0.70	0.02		
35	9.99	12.95	6.08	3.87	4.64	2.00	2.96	0.68	2.02	0.27	1.36	0.10	0.82	0.03	0.38	0.00
40	11.42	16.59	6.95	4.95	5.30	2.56	3.39	0.86	2.31	0.34	1.56	0.13	0.94	0.04	0.43	0.01
45	12.85	20.63	7.82	6.16	5.96	3.19	3.81	1.08	2.60	0.42	1.75	0.16	1.06	0.05	0.49	0.01
50	14.28	25.07	8.69	7.49	6.63	3.88	4.24	1.31	2.89	0.52	1.95	0.20	1.18	0.06	0.54	0.01
55	15.71	29.91	9.56	8.93	7.29	4.62	4.66	1.56	3.18	0.62	2.15	0.24	1.30	0.07	0.60	0.01
60	17.14	35.14	10.43	10.49	7.95	5.43	5.09	1.83	3.47	0.72	2.34	0.28	1.41	0.08	0.65	0.01
65	18.57	40.67	11.29	12.17	8.62	6.30	5.51	2.12	3.76	0.84	2.54	0.32	1.53	0.09	0.70	0.01
70	19.99	46.76	12.16	13.96	9.28	7.23	5.93	2.44	4.05	0.96	2.73	0.37	1.65	0.11	0.76	0.02
75			13.03	15.86	9.94	8.21	6.36	2.77	4.34	1.09	2.93	0.42	1.77	0.12	0.81	0.02
80			13.90	17.88	10.60	9.25	6.78	3.12	4.63	1.23	3.12	0.47	1.89	0.14	0.87	0.02
85			14.77	20.00	11.27	10.35	7.21	3.49	4.91	1.38	3.32	0.53	2.00	0.16	0.92	0.02
90			15.64	22.23	11.93	11.51	7.63	3.88	5.20	1.53	3.51	0.59	2.12	0.17	0.98	0.03
95			16.51	24.58	12.59	12.72	8.05	4.29	5.49	1.69	3.71	0.65	2.24	0.19	1.03	0.03
100			17.38	27.03	13.26	13.99	8.48	4.72	5.78	1.86	3.91	0.72	2.36	0.21	1.09	0.03
110			19.12	32.24	14.58	16.69	9.33	5.63	6.36	2.22	4.30	0.86	2.60	0.25	1.20	0.04
120					15.91	19.61	10.18	6.61	6.94	2.61	4.69	1.01	2.83	0.30	1.30	0.05
130					17.24	22.74	11.02	7.67	7.52	3.03	5.08	1.17	3.07	0.34	1.41	0.05
140					18.56	26.09	11.87	8.80	8.10	3.47	5.47	1.34	3.31	0.39	1.52	0.06
150					19.89	29.64	12.72	10.00	8.68	3.94	5.86	1.52	3.54	0.45	1.63	0.07
160							13.57	11.27	9.26	4.45	6.25	1.71	3.78	0.50	1.74	0.08
170							14.42	12.61	9.83	4.97	6.64	1.92	4.01	0.56	1.85	0.09
180							15.27	14.02	10.41	5.53	7.03	2.13	4.25	0.63	1.96	0.10
190							16.11	15.49	10.99	6.11	7.43	2.35	4.49	0.69	2.07	0.11
200							16.96	17.03	11.57	6.72	7.82	2.59	4.72	0.76	2.18	0.12
225							19.08	21.19	13.02	8.36	8.79	3.22	5.31	0.95	2.45	0.14
250									14.47	10.16	9.77	3.91	5.91	1.15	2.72	0.18
275									15.91	12.12	10.75	4.67	6.50	1.37	3.00	0.21
300									17.36	14.24	11.73	5.49	7.09	1.61	3.27	0.25
325									18.81	16.51	12.70	6.36	7.68	1.87	3.54	0.29
350											13.68	7.30	8.27	2.15	3.81	0.33
375											14.66	8.29	8.86	2.44	4.09	0.37
400											15.64	9.35	9.45	2.75	4.36	0.42
425											16.62	10.46	10.04	3.07	4.63	0.47
450											17.59	11.62	10.63	3.42	4.90	0.52
475											18.57	12.85	11.23	3.78	5.18	0.58
500											19.55	14.13	11.82	4.15	5.45	0.63
550													13.00	4.96	6.00	0.76
600													14.18	5.82	6.54	0.89

Note: Shaded areas of the chart indicate velocities over 5 feet per second (FPS). **Use with caution.**

PVC CLASS 200 IPS PLASTIC PIPE

Sizes 3/4" thru 6"
Flow GPM 1 thru 600

(1120, 1220) SDR 21 C = 150
PSI loss per 100 feet of pipe (PSI/100 FT)

SIZE	3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
OD	1.050		1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
ID	0.930		1.189		1.502		1.720		2.149		2.601		3.166		4.072		5.993	
WALL THK.	0.060		0.063		0.079		0.090		0.113		0.137		0.167		0.214		0.316	
FLOW G. P. M.	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss
1	0.47	0.06	0.28	0.02	0.18	0.01	0.13	0.00										
2	0.94	0.22	0.57	0.07	0.36	0.02	0.27	0.01	0.17	0.00								
3	1.42	0.46	0.86	0.14	0.54	0.04	0.41	0.02	0.26	0.01	0.18	0.00						
4	1.89	0.79	1.15	0.24	0.72	0.08	0.55	0.04	0.35	0.01	0.24	0.01						
5	2.36	1.20	1.44	0.36	0.90	0.12	0.68	0.06	0.44	0.02	0.30	0.01						
6	2.83	1.68	1.73	0.51	1.08	0.16	0.82	0.08	0.53	0.03	0.36	0.01	0.24	0.00				
7	3.30	2.23	2.02	0.67	1.26	0.22	0.96	0.11	0.61	0.04	0.42	0.01	0.28	0.01				
8	3.77	2.85	2.30	0.86	1.44	0.28	1.10	0.14	0.70	0.05	0.48	0.02	0.32	0.01				
9	4.25	3.55	2.59	1.07	1.62	0.34	1.24	0.18	0.79	0.06	0.54	0.02	0.36	0.01				
10	4.72	4.31	2.88	1.30	1.80	0.42	1.37	0.22	0.88	0.07	0.60	0.03	0.40	0.01				
11	5.19	5.15	3.17	1.56	1.98	0.50	1.51	0.26	0.97	0.09	0.66	0.03	0.44	0.01				
12	5.66	6.05	3.46	1.83	2.17	0.59	1.65	0.30	1.06	0.10	0.72	0.04	0.48	0.02	0.29	0.00		
14	6.60	8.05	4.04	2.43	2.53	0.78	1.93	0.40	1.23	0.14	0.84	0.05	0.56	0.02	0.34	0.01		
16	7.55	10.30	4.61	3.11	2.89	1.00	2.20	0.52	1.41	0.17	0.96	0.07	0.65	0.03	0.39	0.01		
18	8.49	12.81	5.19	3.87	3.25	1.24	2.48	0.64	1.59	0.22	1.08	0.09	0.73	0.03	0.44	0.01		
20	9.43	15.58	5.77	4.71	3.61	1.51	2.75	0.78	1.76	0.26	1.20	0.10	0.81	0.04	0.49	0.01		
22	10.38	18.58	6.34	5.62	3.97	1.80	3.03	0.93	1.94	0.32	1.32	0.12	0.89	0.05	0.54	0.01		
24	11.32	21.83	6.92	6.60	4.34	2.12	3.30	1.09	2.12	0.37	1.44	0.15	0.97	0.06	0.59	0.02		
26	12.27	25.32	7.50	7.65	4.70	2.46	3.58	1.27	2.29	0.43	1.56	0.17	1.05	0.07	0.63	0.02		
28	13.21	29.04	8.08	8.78	5.06	2.82	3.86	1.46	2.47	0.49	1.68	0.19	1.13	0.07	0.68	0.02		
30	14.15	33.00	8.65	9.98	5.42	3.20	4.13	1.66	2.65	0.56	1.80	0.22	1.22	0.09	0.73	0.02	0.34	0.00
35	16.51	43.91	10.10	13.27	6.32	4.26	4.82	2.20	3.09	0.75	2.11	0.29	1.42	0.11	0.86	0.03	0.39	0.01
40	18.87	56.23	11.54	17.00	7.23	5.45	5.51	2.82	3.53	0.95	2.41	0.38	1.62	0.14	0.98	0.04	0.45	0.01
45			12.98	21.14	8.13	6.78	6.20	3.51	3.97	1.19	2.71	0.47	1.83	0.18	1.10	0.05	0.51	0.01
50			14.42	25.70	9.04	8.24	6.89	4.26	4.41	1.44	3.01	0.57	2.03	0.22	1.23	0.06	0.56	0.01
55			15.87	30.66	9.94	9.83	7.58	5.09	4.85	1.72	3.31	0.68	2.23	0.26	1.35	0.08	0.62	0.01
60			17.31	36.02	10.85	11.55	8.27	5.97	5.30	2.02	3.61	0.80	2.44	0.31	1.47	0.09	0.68	0.01
65			18.75	41.77	11.75	13.40	8.96	6.93	5.74	2.35	3.92	0.93	2.64	0.36	1.59	0.10	0.73	0.02
70					12.65	15.37	9.65	7.95	6.18	2.69	4.22	1.06	2.84	0.41	1.72	0.12	0.79	0.02
75					13.56	17.47	10.34	9.03	6.62	3.06	4.52	1.21	3.05	0.46	1.84	0.14	0.85	0.02
80					14.46	19.68	11.03	10.18	7.06	3.44	4.82	1.36	3.25	0.52	1.96	0.15	0.90	0.02
85					15.37	22.02	11.72	11.39	7.50	3.85	5.12	1.52	3.45	0.59	2.09	0.17	0.96	0.03
90					16.27	24.48	12.41	12.66	7.95	4.28	5.42	1.69	3.66	0.65	2.21	0.19	1.02	0.03
95					17.18	27.06	13.10	13.99	8.39	4.74	5.72	1.87	3.86	0.72	2.33	0.21	1.07	0.03
100					18.08	29.76	13.79	15.39	8.83	5.21	6.03	2.06	4.07	0.79	2.46	0.23	1.13	0.04
110					19.89	35.50	15.17	18.36	9.71	6.21	6.63	2.45	4.47	0.94	2.70	0.28	1.24	0.04
120							16.54	21.57	10.60	7.30	7.23	2.88	4.88	1.11	2.95	0.33	1.36	0.05
130							17.92	25.02	11.48	8.47	7.84	3.34	5.29	1.29	3.19	0.38	1.47	0.06
140							19.30	28.70	12.36	9.71	8.44	3.84	5.69	1.47	3.44	0.43	1.59	0.07
150									13.25	11.04	9.04	4.36	6.10	1.68	3.69	0.49	1.70	0.08
160									14.13	12.44	9.64	4.91	6.51	1.89	3.93	0.55	1.81	0.08
170									15.01	13.91	10.25	5.50	6.91	2.11	4.18	0.62	1.93	0.09
180									15.90	15.47	10.85	6.11	7.32	2.35	4.42	0.69	2.04	0.11
190									16.78	17.10	11.45	6.75	7.73	2.60	4.67	0.76	2.15	0.12
200									17.66	18.80	12.06	7.43	8.14	2.85	4.92	0.84	2.27	0.13
225									19.87	23.38	13.56	9.24	9.15	3.55	5.53	1.04	2.55	0.16
250											15.07	11.23	10.17	4.31	6.15	1.27	2.83	0.19
275											16.58	13.39	11.19	5.15	6.76	1.51	3.12	0.23
300											18.09	15.74	12.21	6.05	7.38	1.78	3.40	0.27
325											19.60	18.25	13.22	7.01	7.99	2.06	3.69	0.31
350													14.24	8.05	8.61	2.36	3.97	0.36
375													15.26	9.14	9.22	2.69	4.25	0.41
400													16.28	10.30	9.84	3.03	4.54	0.46
425													17.29	11.53	10.45	3.396	4.82	0.52
450													18.31	12.81	11.07	3.77	5.11	0.57
475													19.33	14.16	11.68	4.16	5.39	0.63
500															12.30	4.58	5.67	0.70
550															13.53	5.46	6.24	0.83
600															14.76	6.42	6.81	0.98

Note: Shaded areas of the chart indicate velocities over 5 feet per second (FPS). **Use with caution.**

PVC CLASS 315 IPS PLASTIC PIPE

Sizes 1/2" thru 6"
Flow GPM 1 thru 600

(1120, 1220) SDR 13.5 C = 150
PSI loss per 100 feet of pipe (PSI/100 FT)

SIZE	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
OD	0.840		1.050		1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
ID	0.716		0.894		1.121		1.414		1.618		2.023		2.449		2.982		3.834		5.643	
WALL THK.	0.062		0.078		0.097		0.123		0.141		0.176		0.213		0.259		0.333		0.491	
FLOW G. P. M.	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss
1	0.79	0.22	0.51	0.07	0.32	0.02	0.20	0.01	0.15	0.00										
2	1.59	0.78	1.02	0.27	0.64	0.09	0.40	0.03	0.31	0.01	0.19	0.00								
3	2.38	1.65	1.53	0.56	0.97	0.19	0.61	0.06	0.46	0.03	0.29	0.01	0.20	0.00						
4	3.18	2.82	2.04	0.96	1.29	0.32	0.81	0.10	0.62	0.05	0.39	0.02	0.27	0.01						
5	3.97	4.26	2.55	1.45	1.62	0.48	1.02	0.16	0.77	0.08	0.49	0.03	0.34	0.01	0.22	0.00				
6	4.77	5.97	3.06	2.03	1.94	0.67	1.22	0.22	0.93	0.11	0.59	0.04	0.40	0.02	0.27	0.01				
7	5.57	7.95	3.57	2.70	2.27	0.90	1.42	0.29	1.09	0.15	0.69	0.05	0.47	0.02	0.32	0.01				
8	6.36	10.18	4.08	3.45	2.59	1.15	1.63	0.37	1.24	0.19	0.79	0.06	0.54	0.03	0.36	0.01				
9	7.16	12.66	4.59	4.30	2.92	1.43	1.83	0.46	1.40	0.24	0.89	0.08	0.61	0.03	0.41	0.01				
10	7.95	15.38	5.10	5.22	3.24	1.74	2.04	0.56	1.55	0.29	0.99	0.10	0.68	0.04	0.45	0.01	0.27	0.00		
11	8.75	18.35	5.61	6.23	3.57	2.07	2.24	0.67	1.71	0.35	1.09	0.12	0.74	0.05	0.50	0.02	0.30	0.01		
12	9.55	21.56	6.12	7.32	3.89	2.43	2.44	0.79	1.87	0.41	1.19	0.14	0.81	0.05	0.55	0.02	0.33	0.01		
14	11.14	28.69	7.14	9.74	4.54	3.24	2.85	1.05	2.18	0.54	1.39	0.18	0.95	0.07	0.64	0.03	0.38	0.01		
16	12.73	36.74	8.16	12.47	5.19	4.15	3.26	1.34	2.49	0.70	1.59	0.23	1.08	0.09	0.73	0.04	0.44	0.01		
18	14.32	45.69	9.18	15.51	5.84	5.16	3.67	1.67	2.80	0.87	1.79	0.29	1.22	0.12	0.82	0.04	0.49	0.01		
20	15.91	55.54	10.20	18.86	6.49	6.27	4.08	2.03	3.11	1.05	1.99	0.35	1.36	0.14	0.91	0.05	0.55	0.02		
22	17.50	66.26	11.23	22.50	7.14	7.48	4.48	2.42	3.42	1.25	2.19	0.42	1.49	0.17	1.00	0.06	0.61	0.02		
24	19.10	77.84	12.25	26.43	7.79	8.79	4.89	2.84	3.74	1.47	2.39	0.50	1.63	0.20	1.10	0.08	0.66	0.02		
26			13.27	30.65	8.44	10.19	5.30	3.29	4.05	1.71	2.59	0.58	1.76	0.23	1.19	0.09	0.72	0.03		
28			14.29	35.16	9.09	11.69	5.71	3.78	4.36	1.96	2.79	0.66	1.90	0.26	1.28	0.10	0.77	0.03	0.35	0.00
30			15.31	39.95	9.74	13.29	6.12	4.29	4.67	2.23	2.99	0.75	2.04	0.30	1.37	0.11	0.83	0.03	0.38	0.01
35			17.86	53.15	11.36	17.68	7.14	5.71	5.45	2.96	3.48	1.00	2.38	0.39	1.60	0.15	0.97	0.04	0.44	0.01
40					12.98	22.64	8.16	7.31	6.23	3.80	3.98	1.28	2.72	0.51	1.83	0.19	1.11	0.06	0.51	0.01
45					14.61	28.15	9.18	9.10	7.01	4.72	4.48	1.59	3.06	0.63	2.06	0.24	1.24	0.07	0.57	0.01
50					16.23	34.22	10.20	11.06	7.79	5.74	4.98	1.94	3.40	0.76	2.29	0.29	1.38	0.09	0.64	0.01
55					17.85	40.83	11.22	13.19	8.57	6.85	5.48	2.31	3.74	0.91	2.52	0.35	1.52	0.10	0.70	0.02
60					19.48	47.97	12.24	15.50	9.35	8.04	5.98	2.71	4.08	1.07	2.75	0.41	1.66	0.12	0.76	0.02
65							13.26	17.97	10.13	9.33	6.48	3.15	4.42	1.24	2.98	0.48	1.80	0.14	0.83	0.02
70							14.28	20.62	10.90	10.70	6.97	3.61	4.76	1.42	3.21	0.55	1.94	0.16	0.89	0.02
75							15.30	23.43	11.68	12.16	7.47	4.10	5.10	1.62	3.44	0.62	2.08	0.18	0.96	0.03
80							16.32	26.40	12.46	13.71	7.97	4.62	5.44	1.82	3.67	0.70	2.22	0.21	1.02	0.03
85							17.34	29.54	13.24	15.33	8.47	5.17	5.78	2.04	3.89	0.78	2.35	0.23	1.08	0.04
90							18.36	32.84	14.02	17.05	8.97	5.75	6.12	2.27	4.12	0.87	2.49	0.26	1.15	0.04
95							19.38	36.30	14.80	18.84	9.47	6.35	6.46	2.51	4.35	0.96	2.63	0.28	1.21	0.04
100									15.58	20.72	9.96	6.99	6.80	2.76	4.58	1.06	2.77	0.31	1.28	0.05
110									17.14	24.72	10.96	8.34	7.48	3.29	5.04	1.26	3.05	0.37	1.40	0.06
120									18.70	29.04	11.96	9.79	8.16	3.87	5.50	1.48	3.33	0.44	1.53	0.07
130											12.96	11.36	8.84	4.48	5.96	1.72	3.60	0.51	1.66	0.08
140											13.95	13.03	9.52	5.14	6.42	1.97	3.88	0.58	1.79	0.09
150											14.95	14.81	10.20	5.84	6.88	2.24	4.16	0.66	1.92	0.10
160											15.95	16.69	10.88	6.59	7.34	2.53	4.44	0.74	2.04	0.11
170											16.94	18.67	11.56	7.37	7.79	2.83	4.71	0.83	2.17	0.13
180											17.94	20.75	12.24	8.19	8.25	3.14	4.99	0.93	2.30	0.14
190											18.94	22.94	12.92	9.05	8.71	3.47	5.27	1.02	2.43	0.16
200											19.93	25.23	13.60	9.95	9.17	3.82	5.55	1.12	2.56	0.17
225													15.30	12.38	10.32	4.75	6.24	1.40	2.88	0.21
250													17.00	15.05	11.47	5.77	6.93	1.70	3.20	0.26
275													18.70	17.95	12.61	6.89	7.63	2.03	3.52	0.31
300															13.76	8.09	8.32	2.38	3.84	0.36
325															14.91	9.39	9.02	2.76	4.16	0.42
350															16.05	10.77	9.71	3.17	4.48	0.48
375															17.20	12.23	10.40	3.60	4.80	0.55
400															18.35	13.79	11.10	4.06	5.12	0.62
425															19.49	15.42	11.79	4.54	5.44	0.69
450																	12.49	5.05	5.76	0.77
475																	13.18	5.58	6.08	0.85
500																	13.87	6.14	6.40	0.94
550																	15.26	7.32	7.04	1.12
600																	16.65	8.60	7.68	1.31

Note: Shaded areas of the chart indicate velocities over 5 feet per second (FPS). **Use with caution.**

POLYETHYLENE (PE) SDR-PRESSURE RATED TUBE

Sizes 1/2" thru 6"
Flow GPM 1 thru 600

(2306, 3206, 3306) SDR 7, 9, 11.5, 15 C = 140
PSI loss per 100 feet of tube (PSI/100 FT)

SIZE	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
ID	0.622		0.824		1.049		1.380		1.610		2.067		2.469		3.068		4.026		6.065	
FLOW G. P. M.	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss
1	1.05	0.49	0.60	0.12	0.37	0.04	0.21	0.01	0.15	0.00	0.09	0.00								
2	2.10	1.76	1.20	0.45	0.74	0.14	0.42	0.04	0.31	0.02	0.19	0.01								
3	3.16	3.73	1.80	0.95	1.11	0.29	0.64	0.08	0.47	0.04	0.28	0.01	0.20	0.00						
4	4.21	6.35	2.40	1.62	1.48	0.50	0.85	0.13	0.62	0.06	0.38	0.02	0.26	0.01						
5	5.27	9.60	3.00	2.44	1.85	0.76	1.07	0.20	0.78	0.09	0.47	0.03	0.33	0.01	0.21	0.00				
6	6.32	13.46	3.60	3.43	2.22	1.06	1.28	0.28	0.94	0.13	0.57	0.04	0.40	0.02	0.26	0.01				
7	7.38	17.91	4.20	4.56	2.59	1.41	1.49	0.37	1.10	0.18	0.66	0.05	0.46	0.02	0.30	0.01				
8	8.43	22.93	4.80	5.84	2.96	1.80	1.71	0.474	1.25	0.22	0.76	0.07	0.53	0.03	0.34	0.03				
9	9.49	28.52	5.40	7.26	3.33	2.24	1.92	0.59	1.41	0.28	0.85	0.08	0.60	0.03	0.39	0.01				
10	10.54	34.67	6.00	8.82	3.70	2.73	2.14	0.72	1.57	0.34	0.95	0.10	0.66	0.04	0.43	0.01				
11	11.60	41.36	6.00	10.53	4.07	3.25	2.35	0.86	1.73	0.40	1.05	0.12	0.73	0.05	0.47	0.02	0.27	0.00		
12	12.65	48.60	7.21	12.37	4.44	3.82	2.57	1.01	1.88	0.48	1.14	0.14	0.80	0.06	0.52	0.02	0.30	0.01		
14	14.76	64.65	8.41	16.46	5.19	5.08	2.99	1.34	2.20	0.63	1.33	0.19	0.93	0.08	0.60	0.03	0.35	0.01		
16	16.87	82.79	9.61	21.07	5.93	6.51	3.42	1.71	2.51	0.81	1.52	0.24	1.07	0.10	0.69	0.04	0.40	0.01		
18	18.89	102.97	10.81	26.21	6.67	8.10	3.85	2.13	2.83	1.01	1.71	0.30	1.20	0.13	0.78	0.04	0.45	0.01		
20			12.01	31.86	7.41	9.84	4.28	2.59	3.14	1.22	1.90	0.36	1.33	0.15	0.86	0.05	0.50	0.01		
22			13.21	38.01	8.15	11.74	4.71	3.09	3.46	1.46	2.10	0.43	1.47	0.18	0.95	0.06	0.55	0.02		
24			14.42	44.65	8.89	13.79	5.14	3.63	3.77	1.72	2.29	0.51	1.60	0.21	1.04	0.07	0.60	0.02		
26			15.62	41.79	9.64	16.00	5.57	4.21	4.09	1.99	2.48	0.59	1.74	0.25	1.12	0.09	0.65	0.02		
28			16.82	59.41	10.38	18.35	5.99	4.83	4.40	2.28	2.67	0.68	1.87	0.29	1.21	0.10	0.70	0.03		
30			18.02	67.50	11.12	20.85	6.42	5.49	4.72	2.59	2.86	0.77	2.00	0.32	1.30	0.11	0.75	0.03	0.33	0.00
35					12.97	27.74	7.49	7.31	5.50	3.45	3.34	1.02	2.34	0.43	1.51	0.15	0.88	0.04	0.38	0.01
40					14.83	35.53	8.56	9.36	6.29	4.42	3.81	1.31	2.67	0.55	1.73	0.19	1.00	0.05	0.44	0.01
45					16.68	44.19	9.64	11.64	7.08	5.50	4.29	1.63	3.01	0.69	1.95	0.24	1.13	0.06	0.49	0.01
50					18.53	53.71	10.71	14.14	7.87	6.68	4.77	1.98	3.34	0.83	2.16	0.29	1.25	0.08	0.55	0.01
55							11.78	16.87	8.65	7.97	5.25	2.36	3.68	1.00	2.38	0.35	1.38	0.09	0.61	0.01
60							12.85	19.82	9.44	9.36	5.72	2.78	4.01	1.17	2.60	0.41	1.51	0.11	0.66	0.01
65							13.92	22.99	10.23	10.86	6.20	3.22	4.35	1.36	2.81	0.47	1.63	0.13	0.72	0.02
70							14.99	26.37	11.01	12.46	6.68	3.69	4.68	1.56	3.03	0.54	1.76	0.14	0.77	0.02
75							16.06	29.97	11.80	14.16	7.16	4.20	5.01	1.77	3.25	0.61	1.88	0.16	0.83	0.02
80							17.13	33.77	12.59	15.95	7.63	4.73	5.35	1.99	3.46	0.69	2.01	0.18	0.88	0.03
85							18.21	37.79	13.37	17.85	8.11	5.29	5.68	2.23	3.68	0.77	2.13	0.21	0.94	0.03
90							19.28	42.01	14.16	19.84	8.59	5.88	6.02	2.48	3.90	0.86	2.26	0.23	0.99	0.03
95									14.95	21.93	9.07	6.50	6.35	2.74	4.11	0.95	2.39	0.25	1.05	0.03
100									15.74	24.12	9.54	7.15	6.69	3.01	4.33	1.05	2.51	0.28	1.10	0.04
110									17.31	28.77	10.50	8.53	7.36	3.59	4.76	1.25	2.76	0.33	1.22	0.05
120									18.88	33.80	11.45	10.02	8.03	4.22	5.20	1.47	3.02	0.39	1.33	0.05
130											12.41	11.62	8.70	4.90	5.63	1.70	3.27	0.45	1.44	0.06
140											13.36	13.33	9.37	5.62	6.06	1.95	3.52	0.52	1.55	0.07
150											14.32	15.15	10.03	6.38	6.50	2.22	3.77	0.59	1.66	0.08
160											15.27	17.08	10.70	7.19	6.93	2.50	4.02	0.67	1.77	0.09
170											16.23	19.11	11.37	8.05	7.36	2.80	4.27	0.75	1.88	0.10
180											17.18	21.24	12.04	8.95	7.08	3.11	4.53	0.83	1.99	0.11
190											18.14	23.48	12.71	9.89	8.23	3.44	4.78	0.92	2.10	0.12
200											19.09	25.81	13.38	10.87	8.66	3.78	5.03	1.01	2.21	0.14
225													15.05	13.52	9.75	4.70	5.66	1.25	2.49	0.17
250													16.73	16.44	10.83	5.71	6.29	1.52	2.77	0.21
275													18.40	19.61	11.92	6.82	6.92	1.82	3.05	0.25
300															13.00	8.01	7.55	2.13	3.32	0.29
325															14.08	9.29	8.18	2.48	3.60	0.34
350															15.17	10.65	8.81	2.84	3.88	0.39
375															16.25	12.10	9.43	3.23	4.15	0.44
400															17.33	13.64	10.06	3.64	4.43	0.50
425															18.42	15.26	10.69	4.07	4.71	0.55
450															19.50	16.97	11.32	4.52	4.99	0.62
475																	11.95	5.00	5.26	0.68
500																	12.58	5.50	5.54	0.75
550																	13.84	6.56	6.10	0.89
600																	15.10	7.70	6.65	1.05

Note: Shaded areas of the chart indicate velocities over 5 feet per second (FPS). **Use with caution.**

TYPE K COPPER WATER TUBE

Sizes 1/2" thru 3" — C = 140

Flow GPM 1 thru 600 — PSI loss per 100 feet of tube (PSI/100 FT)

SIZE	1/2"		5/8"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"	
OD	0.625		0.750		0.875		1.125		1.375		1.625		2.125		2.625		3.125	
ID	0.527		0.652		0.745		0.995		1.245		1.481		1.959		2.435		2.907	
WALL THK.	0.049		0.049		0.065		0.065		0.065		0.072		0.083		0.095		0.109	
FLOW G. P. M.	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss
1	1.45	1.09	0.95	0.39	0.73	0.20	0.41	0.05	0.26	0.02	0.18	0.01	0.10	0.00				
2	2.93	3.94	1.91	1.40	1.47	0.73	0.82	0.18	0.52	0.06	0.37	0.03	0.21	0.01				
3	4.40	8.35	2.87	2.974	2.20	1.55	1.23	0.38	0.78	0.13	0.55	0.05	0.31	0.01	0.20	0.00		
4	5.87	14.23	3.83	5.05	2.94	2.64	1.64	0.65	1.05	0.22	0.74	0.09	0.42	0.02	0.27	0.01	0.19	0.00
5	7.34	21.51	4.79	7.64	3.67	3.99	2.06	0.98	1.31	0.33	0.93	0.14	0.53	0.04	0.34	0.01	0.24	0.01
6	8.81	30.15	5.75	10.70	4.41	5.60	2.47	1.37	1.57	0.46	1.11	0.20	0.63	0.05	0.41	0.02	0.28	0.01
7	10.28	40.11	6.71	14.24	5.14	7.44	2.88	1.82	1.84	0.61	1.30	0.26	0.74	0.07	0.48	0.02	0.33	0.01
8	11.75	51.37	7.67	18.24	5.88	9.53	3.29	2.33	2.10	0.78	1.48	0.34	0.85	0.09	0.55	0.03	0.38	0.01
9	13.22	63.89	8.63	22.68	6.61	11.86	3.70	2.90	2.36	0.97	1.67	0.42	0.95	0.11	0.61	0.04	0.43	0.02
10	14.69	77.66	9.59	27.57	7.35	14.41	4.12	3.53	2.63	1.18	1.86	0.51	1.06	0.13	0.68	0.05	0.48	0.02
11	16.15	92.65	10.55	32.89	8.08	17.19	4.53	4.21	2.89	1.41	2.04	0.61	1.16	0.16	0.75	0.05	0.53	0.02
12	17.62	108.85	11.51	38.64	8.82	20.20	4.94	4.94	3.15	1.66	2.23	0.71	1.27	0.18	0.82	0.06	0.57	0.03
14			13.43	51.41	10.29	26.87	5.76	6.57	3.68	2.21	2.60	0.95	1.48	0.24	0.95	0.08	0.67	0.04
16			15.35	65.83	11.76	34.41	6.59	8.42	4.21	2.83	2.97	1.22	1.70	0.31	1.10	0.11	0.77	0.05
18			17.27	81.88	13.23	42.80	7.41	10.47	4.73	3.52	3.34	1.51	1.91	0.39	1.23	0.13	0.86	0.06
20			19.19	99.53	14.70	52.02	8.24	12.73	5.26	4.28	3.72	1.84	1.12	0.47	1.37	0.16	0.96	0.07
22					16.17	62.06	9.06	15.18	5.79	5.10	4.09	2.19	2.33	0.56	1.51	0.20	1.06	0.08
24					17.64	72.92	9.89	17.84	6.31	5.99	4.46	2.58	2.55	0.66	1.65	0.23	1.15	0.10
26					19.11	84.57	10.71	20.69	6.84	6.95	4.83	2.99	2.76	0.77	1.78	0.27	1.25	0.11
28							11.53	23.73	7.37	7.98	5.20	3.43	2.97	0.88	1.92	0.30	1.35	0.13
30							12.36	26.97	7.89	9.06	5.58	3.89	3.18	1.00	2.06	0.35	1.44	0.15
35							14.42	35.88	9.21	12.06	6.51	5.18	3.72	1.33	2.40	0.46	1.68	0.19
40							16.48	45.95	10.52	15.44	7.44	6.63	4.25	1.70	2.75	0.59	1.93	0.25
45							18.54	57.15	11.84	19.20	8.37	8.25	4.78	2.12	3.00	0.73	2.17	0.31
50									13.16	23.34	9.30	10.03	5.31	2.57	3.44	0.89	2.41	0.38
55									14.47	27.85	10.23	11.97	5.84	3.07	3.78	1.06	2.65	0.45
60									15.79	32.71	11.16	14.06	6.37	3.60	4.12	1.25	2.89	0.53
65									17.10	37.94	12.09	16.31	6.91	4.18	4..47	1.45	3.13	0.61
70									18.42	43.52	13.02	18.70	7.44	4.80	4.81	1.66	3.37	0.70
75									19.74	49.45	13.95	21.25	7.97	5.45	5.16	1.89	3.62	0.80
80											14.88	23.95	8.50	6.14	5.50	2.13	3.86	0.90
85											15.81	26.80	9.03	6.87	5.84	2.38	4.10	1.01
90											16.74	29.79	9.56	7.64	6.19	2.65	4.34	1.12
95											17.67	32.93	10.09	8.44	6.53	2.93	4.58	1.24
100											18.60	36.21	10.63	9.28	6.88	3.22	4.82	1.36
110													11.69	11.08	7.56	3.84	5.31	1.62
120													12.75	13.01	8.25	4.52	5.79	1.91
130													13.82	15.09	8.94	5.24	6.27	2.21
140													14.88	17.31	9.63	6.01	6.75	2.54
150													15.94	19.67	10.32	6.83	7.24	2.88
160													17.01	22.17	11.00	7.69	7.72	3.25
170													18.07	24.81	11.69	8.61	8.20	3.64
180													19.13	27.58	12.38	9.57	8.69	4.04
190															13.07	10.58	9.17	4.47
200															13.76	11.63	9.65	4.91
225															15.48	14.47	10.86	6.11
250															17.20	17.58	12.07	7.43
275															18.92	20.98	13.27	8.86
300																	14.48	10.41
325																	15.69	12.07
350																	16.89	13.85
375																	18.10	15.73
400																	19.31	17.73
425																		
450																		
475																		
500																		
550																		
600																		

Note: Shaded areas of the chart indicate velocities over 5 feet per second (FPS). **Use with caution.**

SCHEDULE 40 STANDARD STEEL PIPE

Sizes 1/2" thru 6" — C = 100

Flow GPM 1 thru 600 — PSI loss per 100 feet of pipe (PSI/100 FT)

SIZE	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
OD	0.840		1.050		1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
ID	0.622		0.824		1.049		1.380		1.610		2.067		2.469		3.068		4.026		6.065	
WALL THK.	0.109		0.113		0.133		0.140		0.145		0.154		0.203		0.216		0.237		0.280	
FLOW G. P. M.	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss	Velocity FPS	psi Loss
1	1.05	0.91	0.60	0.23	0.37	007	0.21	0.02	0.15	0.01	0.09	0.00								
2	2.10	3.28	1.20	0.84	0.74	0.26	0.42	0.07	0.31	0.03	0.19	0.01	0.13	0.00						
3	3.16	6.95	1.80	1.77	1.11	0.55	0.64	0.14	0.47	0.07	0.28	0.02	0.20	0.01	0.13	0.00				
4	4.21	11.85	2.40	3.02	1.48	0.93	0.85	0.25	0.62	0.12	0.38	0.03	0.26	0.01	0.17	0.01				
5	5.27	17.91	3.00	4.56	1.85	1.41	1.07	0.37	0.78	0.18	0.47	0.05	0.33	0.02	0.21	0.01				
6	6.32	25.10	3.60	6.39	2.22	1.97	1.28	0.52	0.94	0.25	0.57	0.07	0.40	0.03	0.26	0.01				
7	7.38	33.40	4.20	8.50	2.59	2.63	1.49	0.69	1.10	0.33	0.66	0.10	0.46	0.04	0.30	0.01				
8	8.43	42.77	4.80	10.89	2.96	3.36	1.71	0.89	1.25	0.42	0.76	0.12	0.53	0.05	0.34	0.02	0.20	0.00		
9	9.49	53.19	5.40	13.54	3.33	4.18	1.92	1.10	1.41	0.52	0.85	0.15	0.60	0.06	0.39	0.02	0.22	0.01		
10	10.54	64.65	6.00	16.46	3.70	5.08	2.14	1.34	1.57	0.63	0.95	0.19	0.66	0.08	0.43	0.03	0.25	0.01		
11	11.60	77.13	6.60	19.63	4.07	6.07	2.35	1.60	1.73	0.75	1.05	0.22	0.73	0.09	0.47	0.03	0.27	0.01		
12	12.65	90.62	7.21	23.07	4.44	7.13	2.57	1.88	1.88	0.89	1.14	0.26	0.80	0.11	0.52	0.04	0.30	0.01		
14	14.76	20.56	8.41	30.69	5.19	9.48	2.99	2.50	2.20	1.18	1.33	0.35	0.93	0.15	0.60	0.05	0.35	0.01		
16	16.87	54.39	9.61	39.30	5.93	12.14	3.42	3.20	2.51	1.51	1.52	0.45	1.07	0.19	0.69	0.07	0.40	0.02		
18	18.89	92.02	10.81	48.88	6.67	15.10	3.85	3.98	2.83	1.88	1.71	0.56	1.20	0.23	0.78	0.08	0.45	0.02		
20			12.01	59.41	7.41	18.35	4.28	4.83	3.14	2.28	1.90	0.68	1.33	0.29	0.86	0.10	0.50	0.03		
22			13.21	70.88	8.15	21.90	4.71	5.77	3.46	2.72	2.10	0.81	1.47	0.34	0.95	0.12	0.55	0.03	0.24	0.00
24			14.42	83.27	8.89	25.72	5.14	6.77	3.77	3.20	2.29	0.95	1.60	0.40	1.04	0.14	0.60	0.04	0.26	0.01
26			15.62	96.57	9.64	29.83	5.57	7.86	4.09	3.71	2.48	1.10	1.74	0.46	1.12	0.16	0.65	0.04	0.28	0.01
28			16.82	110.8	10.38	34.22	5.99	9.01	4.40	4.26	2.67	1.26	1.87	0.53	1.21	0.18	0.70	0.05	0.31	0.01
30			18.02	125.9	11.12	38.89	6.42	10.24	4.72	4.84	2.86	1.43	2.00	0.60	1.30	0.21	0.75	0.06	0.33	0.01
35					12.97	51.74	7.49	13.62	5.50	6.44	3.34	1.91	2.34	0.80	1.51	0.28	0.88	0.07	0.38	0.01
40					14.83	66.25	8.56	17.45	6.29	8.24	3.81	2.44	2.67	1.03	1.73	0.36	1.00	0.10	0.44	0.01
45					16.68	82.40	9.64	21.70	7.08	10.25	4.29	3.04	3.01	1.28	1.95	0.44	1.13	0.12	0.49	0.02
50					18.53	100.2	10.71	26.37	7.87	12.46	4.77	3.69	3.34	1.56	2.16	0.54	1.25	0.14	0.55	0.02
55							11.78	31.47	8.65	14.86	5.25	4.41	3.68	1.86	2.38	0.65	1.38	0.17	0.61	0.02
60							12.85	36.97	9.44	17.46	5.72	5.18	4.01	2.18	2.60	0.76	1.51	0.20	0.66	0.03
65							13.92	42.88	10.23	20.25	6.20	6.00	4.35	2.53	2.81	0.88	1.63	0.23	0.72	0.03
70							14.99	49.18	11.01	23.23	6.68	6.89	4.68	2.90	3.03	1.01	1.76	0.27	0.77	0.04
75							16.06	55.89	11.80	26.40	7.16	7.83	5.01	3.30	3.25	1.15	1.88	0.31	0.83	0.04
80							17.13	62.98	12.59	29.75	7.63	8.82	5.35	3.72	3.46	1.29	2.01	0.34	0.88	0.05
85							18.21	70.47	13.37	33.29	8.11	9.87	5.68	4.16	3.68	1.44	2.13	0.39	0.94	0.05
90							19.28	78.33	14.16	37.00	8.59	10.97	6.02	4.62	3.90	1.61	2.26	0.43	0.99	0.06
95									14.95	40.90	9.07	12.13	6.35	5.11	4.11	1.78	2.39	0.47	1.05	0.06
100									15.74	44.97	9.54	13.33	6.69	5.62	4.33	1.95	2.51	0.52	1.10	0.07
110									17.31	53.66	10.50	15.91	7.36	6.7	4.76	2.33	2.76	0.62	1.22	0.08
120									18.88	63.04	11.45	18.69	8.03	7.87	5.20	2.74	3.02	0.73	1.33	0.10
130											12.41	21.68	8.70	9.13	5.63	3.17	3.27	0.85	1.44	0.12
140											13.36	24.87	9.37	10.47	6.06	3.64	3.52	0.97	1.55	0.13
150											14.32	28.26	10.03	11.90	6.50	4.14	3.77	1.10	1.66	0.15
160											15.27	31.84	10.70	13.41	6.93	4.66	4.02	1.24	1.77	0.17
170											16.23	35.63	11.37	15.01	7.36	5.22	4.27	1.39	1.88	0.19
180											17.18	39.61	12.04	16.68	7.80	5.80	4.53	1.55	1.99	0.21
190											18.14	43.78	12.71	18.44	8.23	6.41	4.78	1.71	2.10	0.23
200											19.09	48.14	13.38	20.28	8.66	7.05	5.03	1.88	2.21	0.26
225													15.08	25.22	9.75	8.76	5.66	2.34	2.49	0.32
250													16.73	30.65	10.83	10.65	6.29	2.84	2.77	0.39
275													18.40	36.57	11.92	12.71	6.92	3.39	3.05	0.46
300															13.00	14.93	7.55	3.98	3.32	0.54
325															14.08	17.32	8.18	4.62	3.60	0.63
350															15.17	19.87	8.81	5.30	3.88	0.72
375															16.25	22.57	9.43	6.02	4.15	0.82
400															17.33	25.44	10.06	6.78	4.43	0.92
425															18.42	28.46	10.69	7.59	4.71	1.03
450															19.50	31.64	11.32	8.43	4.99	1.15
475																	11.95	9.32	5.26	1.27
500																	12.58	10.25	5.54	1.40
550																	13.84	12.23	6.10	1.67
600																	15.10	14.37	6.65	1.96

Note: Shaded areas of the chart indicate velocities over 5 feet per second (FPS). **Use with caution.**

All K-Rain gear drive rotors carry a five year *"Limited Warranty"* from the date of purchase. All other K-Rain products carry a two year *"Limited Warranty"* from the date of purchase unless otherwise stated. During this period K-Rain will repair or replace (at K-Rain's option) the product or any part if the product is found to be defective as to workmanship or material.

This warranty does not extend to damage to a K-Rain product resulting from misuse, neglect or abuse, normal wear and tear, or accident, to exterior appearance or color or due to improper installation. Various products may carry a longer warranty time period; check individual product specification sheets for warranty period.

This warranty extends only to an original user of a K-Rain product.

IN NO EVENT SHALL K-RAIN BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. ALL IMPLIED WARRANTIES ARE LIMITED IN DURATION TO TWO YEARS FOLLOWING DATE OF PURCHASE UNLESS INDICATED OTHERWISE.

Some U.S. states do not permit the exclusion or limitation of incidental or consequential damages or of implied warranties. Therefore, the above exclusions or limitations may not apply to you. If a defect arises in a K-Rain product within the warranty period, you should promptly contact your K-Rain installer, distributor or K-RAIN MANUFACTURING CORPORATION.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. If you have any questions concerning the warranty or its application, please contact K-Rain:

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