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## Rain Bird Online Resources and Contacts List

Programs and Marketing Resources	Contacts/Information
Design and Specification Resources	<a href="http://www.rainbird.com/landscape">www.rainbird.com/landscape</a> (Select from product list in left menu)
Distributor Portal Website	<a href="http://ww2.rainbird.com/turfdistributor">ww2.rainbird.com/turfdistributor</a>
Public and Non-Profit Agencies Portal	<a href="http://www.rainbird.com/agency">www.rainbird.com/agency</a>
Facebook	<a href="http://www.facebook.com/RainBirdCorp">www.facebook.com/RainBirdCorp</a>
Intelligent Use of Water™	<a href="http://www.rainbird.com/IUOW">www.rainbird.com/IUOW</a>
LEED Library	<a href="http://www.rainbird.com/LEED">www.rainbird.com/LEED</a>
Photos and Logos	<a href="http://www.rainbird.com/library">www.rainbird.com/library</a>
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Twitter	<a href="http://www.twitter.com/rainbirdcorp">www.twitter.com/rainbirdcorp</a>
Water Efficiency Calculators	<a href="http://www.rainbird.com/calculators">www.rainbird.com/calculators</a>
Webinars	<a href="http://www.rainbird.com/webinars">www.rainbird.com/webinars</a>
YouTube	<a href="http://www.youtube.com/rainbirdcorp">www.youtube.com/rainbirdcorp</a>



## Rain Bird Training Services

Dedicated to the Development of Irrigation Professionals

### Three Programs to Meet Your Needs

- Instructors are credentialed and experienced irrigation professionals
- Classes are pre-approved for Irrigation Association (IA) CEUs
- Classes are open to all green industry professionals



### Rain Bird Academy

#### General Irrigation Skills Training

- Top quality training on many manufactures' products
- Prepare for Irrigation Association (IA) exams
- The Rain Bird Academy Boot Camp delivers the basics of irrigation in one week.
  - Boot Camp classes are part of the IA Select Program



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- Be an expert on installing, managing and maintaining Rain Bird irrigation systems.
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#### Customized and Private Classes

- Training is customized based on your organizations unique needs
- We come to your facility with everything needed to hold training
- From basic irrigation troubleshooting to central control, your staff will get the skills they need

For pricing and course registration, please visit: [www.rainbirdsolutions.com](http://www.rainbirdsolutions.com)

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You're working hard to build a successful business and Rain Bird Rewards is here to reward you. We have the benefits and tools you can use to attract new customers, train your employees and reduce costs. Reinvesting in your company and its future success has never been so easy.

Join today — and get the benefits you need to take your business to the next level.

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Receive 20% off professional-level training from Rain Bird Training Services.

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Let Rain Bird reward your growing business now and in the future.

## Customer Service

At Rain Bird, we believe that when you purchase our products, you should also receive the support you need to ensure that they perform as designed. Like our products, Rain Bird customer service is designed to exceed expectations. When you call with questions about orders or new products, you get the support you need from the top water management professionals in the industry backed by our vast global network of distributor-partners.

## Worry-Free Warranties

Our comprehensive product warranties make it even easier to choose Rain Bird and relax. Most Rain Bird Landscape Irrigation products are warranted to the trade for a period of either three or five years from the date of original purchase. A Rain Bird warranty is hassle-free support that enables maximum peak performance by irrigation system professionals. For you, it's the added peace of mind of knowing Rain Bird is there when you need it.

### Rain Bird's Professional Customer Satisfaction Policy

Rain Bird will repair or replace at no charge any Rain Bird professional product that fails in normal use within the warranty period stated below. You must return it to the dealer or distributor where you bought it. Product failures due to acts of God including without limitation, lightning and flooding, are not covered by this warranty. This commitment to repair or replace is our sole and total warranty.

### Implied Warranties of Merchantability and Fitness, if Applicable, are Limited to One Year from the Date of Sale.

We will not, under any circumstances be liable for incidental or consequential damages, no matter how they occur.

#### I. Landscape Irrigation and Drainage Products

1800 Series Pop-Up Spray Heads, U-Series Nozzles, PA-8S and PA-8S-PRS Shrub Adapters, 1300 and 1400 Bubblers, 5000 Series Rotors, 5500 Series Rotors, 8005 Series Rotors, Falcon® 6504 Series Rotors, PEB/PESB/PESB-R Plastic Valves, DV/DVF and ASVF Plastic Valves, VB Series Valve Boxes and XF Series Dripline\* – 5 years

C2 Power Unit – 2 years

Pump Start Relays – 1 year for controls/electronics, 2 years for enclosure

All other Landscape Irrigation and Drainage products – 3 years

#### II. Golf Products, Agricultural Products, and Pump Stations

For complete information and details please visit:

<http://www.rainbird.com/corporate/CustomerSatisfactionPolicy.htm>

#### III. All Other Products - 1 year

*\*XF Series Dripline - 7 Years on Environmental Stress Cracking (ESCR)*

**For more information, see your Rain Bird Distributor. To find the nearest authorized distributor in your area, visit [www.rainbird.com](http://www.rainbird.com) or call 1-800-RAINBIRD**

## How to Use This Catalog

### Precipitation Rates

Rain Bird has calculated for you the precipitation rates for our comprehensive lines of impacts, sprays, and rotors. These rates are an indication of the approximate rate at which water is being applied. The equations used to calculate the precipitation rates are as follows:

Square Spacing		Triangular Spacing	
U.S.:	Metric:	U.S.:	Metric:
PR=96.3 x gpm	PR=1000 x m <sup>3</sup> /h	PR=96.3 x gpm	PR=1000 x m <sup>3</sup> /h
S x S	S x S	S x L	S x L

96.3 = Constant (inches/square foot/hour)

1000 = Constant (millimeter/square meter/hour)

gpm = Gallons per minute (applied to area by sprinklers)

m<sup>3</sup>/h = Cubic meters per hour (applied to area by sprinklers)

S = Spacing between sprinklers

L = Spacing between rows (S x 0.866)

### Specification Information

The information in this catalog was accurate at the time of printing and may be used for proper specification of each product. For the most up-to-date information, go to the Rain Bird web site at [www.rainbird.com](http://www.rainbird.com).

### ASABE Test Certification Statement

Rain Bird Corporation certifies that pressure, flow rate, and radius data for its products were determined and listed in accordance with ASABE Standard S398.1, Procedure for Sprinkler Testing and Performance Reporting, and are representative of performance of production sprinklers at the time of publication. Actual product performance may differ from the published specifications due to normal manufacturing variations and sample selection. All other specifications are solely the recommendations of Rain Bird Corporation.

### Reference Charts

Information contained in this catalog is based upon generally accepted formulas, computations, and trade practices. Rain Bird Corporation, and its subsidiaries and affiliates, shall not be responsible or liable therefore if any problems, difficulties, or injuries should arise from or in connection with the use or application of this information, or if there is any error herein, typographical or otherwise.

## Technical Support

Rain Bird Technical Support has the answers to your specific product and water-management questions. Call our toll-free Technical Service or Spec Hotline numbers, or for maximum convenience, access the Rain Bird web site. You'll get expert advice and the right solutions.

Technical Service	Spec Hotline	Internet Address
1-800-RAINBIRD (1-800-724-6247)	1-800-458-3005	<a href="http://www.rainbird.com">www.rainbird.com</a>

## Pressure Loss Through Water Meters

Pressure Loss: psi  
Nominal Size

Flow gpm	5/8"	3/4"	1"	1 1/2"	2"	3"	4"
1	0.2	0.1					
2	0.3	0.2					
3	0.4	0.3					
4	0.6	0.5	0.1				
5	0.9	0.6	0.2				
6	1.3	0.7	0.3				
7	1.8	0.8	0.4				
8	2.3	1.0	0.5				
9	3.0	1.3	0.6				
10	3.7	1.6	0.7				
11	4.4	1.9	0.8				
12	5.1	2.2	0.9				
13	6.1	2.6	1.0				
14	7.2	3.1	1.1				
15	8.3	3.6	1.2				
16	9.4	4.1	1.4	0.4			
17	10.7	4.6	1.6	0.5			
18	12.0	5.2	1.8	0.6			
19	13.4	5.8	2.0	0.7			
20	15.0	6.5	2.2	0.8			
22		7.9	2.8	1.0			
24		9.5	3.4	1.2			
26		11.2	4.0	1.4			
28		13.0	4.6	1.6			
30		15.0	5.3	1.8			
32			6.0	2.1	0.8		
34			6.9	2.4	0.9		
36			7.8	2.7	1.0		
38			8.7	3.0	1.2		
40			9.6	3.3	1.3		
42			10.6	3.6	1.4		
44			11.7	3.9	1.5		
46			12.8	4.2	1.6		
48			13.9	4.5	1.7		
50			15.0	4.9	1.9	0.7	
52				5.3	2.1		
54				5.7	2.2		
56				6.2	2.3		
58				6.7	2.5		
60				7.2	2.7		
65				8.3	3.2	1.1	
70				9.8	3.7	1.3	
75				11.2	4.3	1.5	
80				12.8	4.9	1.6	0.7
90				16.1	6.2	2.0	0.8
100				20.0	7.8	2.5	0.9
110					9.5	2.9	1.0
120					11.3	3.4	1.2
130					13.0	3.9	1.4
140					15.1	4.5	1.6
150					17.3	5.1	1.8
160					20.0	5.8	2.1
170						6.5	2.4
180						7.2	2.7
190						8.0	3.0
200						9.0	3.2
220						11.0	3.9
240						13.0	4.7
260						15.0	5.5
280						17.3	6.3
300						20.0	7.2
350							10.0
400							13.0
450							16.2
500							20.0



PVC Class 160 IPS Plastic Pipe																
(1120, 1220) SDR 26 C=150																
psi Loss per 100 Feet of Pipe (psi/100 ft)																
Sizes 1" through 6" Flow 1 through 600 gpm																
Nominal Size	1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
Pipe OD	1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
Avg. ID	1.175		1.512		1.734		2.173		2.635		3.21		4.134		6.084	
Avg. Wall	0.070		0.074		0.083		0.101		0.120		0.145		0.183		0.271	
Tolerance	0.020		0.020		0.020		0.020		0.020		0.020		0.020		0.031	
Min. Wall	0.060		0.064		0.073		0.091		0.110		0.135		0.173		0.255	
Flow (gpm)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)
1	0.30	0.02	0.18	0.01	0.14	0.00	0.09	0.00	0.06	0.00	0.04	0.00	0.02	0.00	0.01	0.00
2	0.59	0.07	0.36	0.02	0.27	0.01	0.17	0.00	0.12	0.00	0.08	0.00	0.05	0.00	0.02	0.00
3	0.89	0.15	0.54	0.04	0.41	0.02	0.26	0.01	0.18	0.00	0.12	0.00	0.07	0.00	0.03	0.00
4	1.18	0.25	0.71	0.07	0.54	0.04	0.35	0.01	0.24	0.00	0.16	0.00	0.10	0.00	0.04	0.00
5	1.48	0.38	0.89	0.11	0.68	0.06	0.43	0.02	0.29	0.01	0.20	0.00	0.12	0.00	0.06	0.00
6	1.77	0.54	1.07	0.16	0.81	0.08	0.52	0.03	0.35	0.01	0.24	0.00	0.14	0.00	0.07	0.00
7	2.07	0.71	1.25	0.21	0.95	0.11	0.60	0.04	0.41	0.01	0.28	0.01	0.17	0.00	0.08	0.00
8	2.36	0.91	1.43	0.27	1.09	0.14	0.69	0.05	0.47	0.02	0.32	0.01	0.19	0.00	0.09	0.00
9	2.66	1.14	1.61	0.33	1.22	0.17	0.78	0.06	0.53	0.02	0.36	0.01	0.21	0.00	0.10	0.00
10	2.96	1.38	1.78	0.40	1.36	0.21	0.86	0.07	0.59	0.03	0.40	0.01	0.24	0.00	0.11	0.00
11	3.25	1.65	1.96	0.48	1.49	0.25	0.95	0.08	0.65	0.03	0.44	0.01	0.26	0.00	0.12	0.00
12	3.55	1.94	2.14	0.57	1.63	0.29	1.04	0.10	0.71	0.04	0.48	0.01	0.29	0.00	0.13	0.00
14	4.14	2.58	2.50	0.76	1.90	0.39	1.21	0.13	0.82	0.05	0.55	0.02	0.33	0.01	0.15	0.00
16	4.73	3.30	2.86	0.97	2.17	0.50	1.38	0.17	0.94	0.06	0.63	0.02	0.38	0.01	0.18	0.00
18	5.32	4.10	3.21	1.20	2.44	0.62	1.56	0.21	1.06	0.08	0.71	0.03	0.43	0.01	0.20	0.00
20	5.91	4.99	3.57	1.46	2.71	0.75	1.73	0.25	1.18	0.10	0.79	0.04	0.48	0.01	0.22	0.00
22	6.50	5.95	3.93	1.74	2.99	0.90	1.90	0.30	1.29	0.12	0.87	0.04	0.53	0.01	0.24	0.00
24	7.09	6.99	4.28	2.05	3.26	1.05	2.07	0.35	1.41	0.14	0.95	0.05	0.57	0.02	0.26	0.00
26	7.68	8.11	4.64	2.38	3.53	1.22	2.25	0.41	1.53	0.16	1.03	0.06	0.62	0.02	0.29	0.00
28	8.27	9.30	5.00	2.73	3.80	1.40	2.42	0.47	1.65	0.18	1.11	0.07	0.67	0.02	0.31	0.00
30	8.87	10.57	5.35	3.10	4.07	1.59	2.59	0.53	1.76	0.21	1.19	0.08	0.72	0.02	0.33	0.00
35	10.34	14.06	6.25	4.12	4.75	2.12	3.02	0.71	2.06	0.28	1.39	0.11	0.84	0.03	0.39	0.00
40	11.82	18.00	7.14	5.28	5.43	2.71	3.46	0.90	2.35	0.35	1.58	0.14	0.95	0.04	0.44	0.01
45	13.30	22.39	8.03	6.56	6.11	3.37	3.89	1.12	2.64	0.44	1.78	0.17	1.07	0.05	0.50	0.01
50	14.78	27.21	8.92	7.98	6.78	4.10	4.32	1.37	2.94	0.53	1.98	0.20	1.19	0.06	0.55	0.01
55			9.82	9.52	7.46	4.89	4.75	1.63	3.23	0.64	2.18	0.24	1.31	0.07	0.61	0.01
60			10.71	11.18	8.14	5.74	5.18	1.91	3.53	0.75	2.38	0.29	1.43	0.08	0.66	0.01
65			11.60	12.97	8.82	6.66	5.62	2.22	3.82	0.87	2.57	0.33	1.55	0.10	0.72	0.01
70			12.49	14.88	9.50	7.64	6.05	2.55	4.11	1.00	2.77	0.38	1.67	0.11	0.77	0.02
75			13.38	16.90	10.18	8.68	6.48	2.89	4.41	1.13	2.97	0.43	1.79	0.13	0.83	0.02
80			14.28	19.05	10.86	9.78	6.91	3.26	4.70	1.28	3.17	0.49	1.91	0.14	0.88	0.02
85					11.53	10.94	7.34	3.65	4.99	1.43	3.37	0.55	2.03	0.16	0.94	0.02
90					12.21	12.16	7.78	4.06	5.29	1.59	3.56	0.61	2.15	0.18	0.99	0.03
95					12.89	13.45	8.21	4.48	5.58	1.76	3.76	0.67	2.27	0.20	1.05	0.03
100					13.57	14.79	8.64	4.93	5.88	1.93	3.96	0.74	2.39	0.22	1.10	0.03
110					14.93	17.64	9.50	5.88	6.46	2.30	4.36	0.88	2.63	0.26	1.21	0.04
120							10.37	6.91	7.05	2.71	4.75	1.04	2.86	0.30	1.32	0.05
130							11.23	8.02	7.64	3.14	5.15	1.20	3.10	0.35	1.43	0.05
140							12.10	9.20	8.23	3.60	5.54	1.38	3.34	0.40	1.54	0.06
150							12.96	10.45	8.81	4.09	5.94	1.57	3.58	0.46	1.65	0.07
160							13.82	11.77	9.40	4.61	6.34	1.76	3.82	0.52	1.76	0.08
170							14.69	13.17	9.99	5.16	6.73	1.97	4.06	0.58	1.87	0.09
180									10.58	5.73	7.13	2.19	4.30	0.64	1.98	0.10
190									11.16	6.34	7.52	2.42	4.54	0.71	2.09	0.11
200									11.75	6.97	7.92	2.67	4.77	0.78	2.20	0.12
225									13.22	8.67	8.91	3.32	5.37	0.97	2.48	0.15
250									14.69	10.53	9.90	4.03	5.97	1.18	2.76	0.18
275											10.89	4.81	6.57	1.40	3.03	0.21
300											11.88	5.65	7.16	1.65	3.31	0.25
325											12.87	6.55	7.76	1.91	3.58	0.29
350											13.86	7.52	8.36	2.19	3.86	0.33
375											14.85	8.54	8.95	2.49	4.13	0.38
400													9.55	2.81	4.41	0.43
425													10.15	3.14	4.68	0.48
450													10.74	3.50	4.96	0.53
475													11.34	3.86	5.24	0.59
500													11.94	4.25	5.51	0.65
550													13.13	5.07	6.06	0.77
600													14.32	5.96	6.61	0.91

Note: Dark shaded area of chart indicates velocities over 5' per second. Use with caution

The velocity values were derived using the following equation  $V = \frac{0.408 \times Q_{gpm}}{d^2}$

Table are based upon the following Hazen-Williams equation:  $H_f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \times \frac{Q^{1.852}}{D^{4.8655}}$  for change in psi per foot of elevation. Pressure loss for uphill elevation and pressure gain for downhill elevation changes.

PVC Class 200 IPS Plastic Pipe

(1120, 1220) SDR 21 C=150

psi Loss per 100 Feet of Pipe (psi/100 ft.)

Sizes 3/4" through 6" Flow 1 through 600 gpm

Nominal Size	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	
Pipe OD	1.050	1.315	1.660	1.900	2.375	2.875	3.500	4.500	6.625	
Avg. ID	0.91	1.169	1.482	1.7	2.129	2.581	3.146	4.046	5.955	
Avg. Wall	0.070	0.073	0.089	0.100	0.123	0.147	0.177	0.227	0.335	
Tolerance	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.026	0.038	
Min. Wall	0.060	0.063	0.079	0.090	0.113	0.137	0.167	0.214	0.316	
Flow (gpm)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)
1	0.49	0.07	0.30	0.02	0.19	0.01	0.14	0.00	0.02	0.00
2	0.99	0.24	0.60	0.07	0.37	0.02	0.28	0.01	0.18	0.00
3	1.48	0.52	0.90	0.15	0.56	0.05	0.42	0.02	0.27	0.01
4	1.97	0.88	1.19	0.26	0.74	0.08	0.56	0.04	0.36	0.01
5	2.46	1.33	1.49	0.39	0.93	0.12	0.71	0.06	0.45	0.02
6	2.96	1.86	1.79	0.55	1.11	0.17	0.85	0.09	0.54	0.03
7	3.45	2.47	2.09	0.73	1.30	0.23	0.99	0.12	0.63	0.04
8	3.94	3.17	2.39	0.94	1.49	0.30	1.13	0.15	0.72	0.05
9	4.43	3.94	2.69	1.17	1.67	0.37	1.27	0.19	0.81	0.06
10	4.93	4.79	2.99	1.42	1.86	0.45	1.41	0.23	0.90	0.08
11	5.42	5.72	3.28	1.69	2.04	0.53	1.55	0.27	0.99	0.09
12	5.91	6.71	3.58	1.98	2.23	0.63	1.69	0.32	1.08	0.11
14	6.90	8.93	4.18	2.64	2.60	0.83	1.98	0.43	1.26	0.14
16	7.88	11.44	4.78	3.38	2.97	1.07	2.26	0.55	1.44	0.18
18	8.87	14.23	5.37	4.21	3.34	1.33	2.54	0.68	1.62	0.23
20	9.85	17.29	5.97	5.11	3.72	1.61	2.82	0.83	1.80	0.28
22	10.84	20.63	6.57	6.10	4.09	1.92	3.11	0.99	1.98	0.33
24	11.82	24.24	7.17	7.17	4.46	2.26	3.39	1.16	2.16	0.39
26	12.81	28.11	7.76	8.31	4.83	2.62	3.67	1.34	2.34	0.45
28	13.80	32.25	8.36	9.53	5.20	3.01	3.95	1.54	2.52	0.52
30	14.78	36.64	8.96	10.83	5.57	3.41	4.24	1.75	2.70	0.59
35			10.45	14.41	6.50	4.54	4.94	2.33	3.15	0.78
40			11.94	18.45	7.43	5.82	5.65	2.98	3.60	1.00
45			13.44	22.95	8.36	7.24	6.35	3.71	4.05	1.24
50			14.93	27.90	9.29	8.79	7.06	4.51	4.50	1.51
55					10.22	10.49	7.76	5.38	4.95	1.80
60					11.15	12.33	8.47	6.32	5.40	2.11
65					12.07	14.30	9.18	7.33	5.85	2.45
70					13.00	16.40	9.88	8.41	6.30	2.81
75					13.93	18.63	10.59	9.56	6.75	3.20
80					14.86	21.00	11.29	10.77	7.20	3.60
85							12.00	12.05	7.65	4.03
90							12.71	13.40	8.10	4.48
95							13.41	14.81	8.55	4.95
100							14.12	16.28	9.00	5.45
110							9.90	6.50	6.74	2.55
120							10.80	7.63	7.35	2.99
130							11.70	8.85	7.96	3.47
140							12.60	10.16	8.57	3.98
150							13.50	11.54	9.19	4.52
160							14.40	13.01	9.80	5.10
170							10.41	5.70	7.01	2.18
180							11.02	6.34	7.42	2.42
190							11.64	7.01	7.83	2.67
200							12.25	7.71	8.24	2.94
225							13.78	9.58	9.28	3.66
250							15.31	11.65	10.31	4.45
275									11.34	5.30
300									12.37	6.23
325									13.40	7.23
350									14.43	8.29
375									9.35	2.77
400									9.97	3.12
425									10.59	3.49
450									11.22	3.88
475									11.84	4.29
500									12.46	4.72
550									13.71	5.63
600									14.95	6.61

Note: Dark shaded area of chart indicates velocities over 5' per second. Use with caution

The velocity values were derived using the following equation  $V = \frac{0.408 \times Q_{gpm}}{d^2}$

Table are based upon the following Hazen-Williams equation:  $H_f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \times \frac{Q^{1.852}}{D^{4.8655}}$  for change in psi per foot of elevation. Pressure loss for uphill elevation and pressure gain for downhill elevation changes.

PVC Class 315 IPS Plastic Pipe																				
(1120, 1220) SDR 13.5 C=150																				
psi Loss per 100 Feet of Pipe (psi/100 ft.)																				
Sizes 1/2" through 6" Flow 1 through 600 gpm																				
Nominal Size	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
Pipe OD	0.840		1.050		1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
Avg. ID	0.6960		0.8740		1.1010		1.3940		1.5980		2.0030		2.4230		2.9510		3.7940		5.5840	
Avg. Wall	0.072		0.088		0.107		0.133		0.151		0.186		0.226		0.275		0.353		0.521	
Tolerance	0.020		0.020		0.020		0.020		0.020		0.020		0.026		0.031		0.040		0.059	
Min. Wall	0.062		0.078		0.097		0.123		0.141		0.176		0.213		0.259		0.333		0.491	
Flow (gpm)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)
1	0.84	0.25	0.53	0.08	0.34	0.03	0.21	0.01	0.16	0.00	0.10	0.00	0.07	0.00	0.05	0.00	0.03	0.00	0.01	0.00
2	1.68	0.90	1.07	0.30	0.67	0.10	0.42	0.03	0.32	0.02	0.20	0.01	0.14	0.00	0.09	0.00	0.06	0.00	0.03	0.00
3	2.53	1.90	1.60	0.63	1.01	0.20	0.63	0.06	0.48	0.03	0.31	0.01	0.21	0.00	0.14	0.00	0.09	0.00	0.04	0.00
4	3.37	3.24	2.14	1.07	1.35	0.35	0.84	0.11	0.64	0.06	0.41	0.02	0.28	0.01	0.19	0.00	0.11	0.00	0.05	0.00
5	4.21	4.89	2.67	1.61	1.68	0.53	1.05	0.17	0.80	0.09	0.51	0.03	0.35	0.01	0.23	0.00	0.14	0.00	0.07	0.00
6	5.05	6.86	3.20	2.26	2.02	0.74	1.26	0.23	0.96	0.12	0.61	0.04	0.42	0.02	0.28	0.01	0.17	0.00	0.08	0.00
7	5.90	9.12	3.74	3.01	2.36	0.98	1.47	0.31	1.12	0.16	0.71	0.05	0.49	0.02	0.33	0.01	0.20	0.00	0.09	0.00
8	6.74	11.68	4.27	3.86	2.69	1.25	1.68	0.40	1.28	0.20	0.81	0.07	0.56	0.03	0.37	0.01	0.23	0.00	0.10	0.00
9	7.58	14.53	4.81	4.80	3.03	1.56	1.89	0.49	1.44	0.25	0.92	0.08	0.63	0.03	0.42	0.01	0.26	0.00	0.12	0.00
10	8.42	17.66	5.34	5.83	3.37	1.90	2.10	0.60	1.60	0.31	1.02	0.10	0.69	0.04	0.47	0.02	0.28	0.00	0.13	0.00
11	9.26	21.07	5.88	6.96	3.70	2.26	2.31	0.72	1.76	0.37	1.12	0.12	0.76	0.05	0.52	0.02	0.31	0.01	0.14	0.00
12	10.11	24.75	6.41	8.17	4.04	2.66	2.52	0.84	1.92	0.43	1.22	0.14	0.83	0.06	0.56	0.02	0.34	0.01	0.16	0.00
14	11.79	32.93	7.48	10.87	4.71	3.53	2.94	1.12	2.24	0.58	1.42	0.19	0.97	0.08	0.66	0.03	0.40	0.01	0.18	0.00
16	13.48	42.16	8.55	13.92	5.39	4.53	3.36	1.44	2.56	0.74	1.63	0.25	1.11	0.10	0.75	0.04	0.45	0.01	0.21	0.00
18	15.16	52.44	9.61	17.32	6.06	5.63	3.78	1.79	2.88	0.92	1.83	0.31	1.25	0.12	0.84	0.05	0.51	0.01	0.24	0.00
20			10.68	21.05	6.73	6.84	4.20	2.17	3.20	1.12	2.03	0.37	1.39	0.15	0.94	0.06	0.57	0.02	0.26	0.00
22			11.75	25.11	7.40	8.16	4.62	2.59	3.52	1.33	2.24	0.44	1.53	0.18	1.03	0.07	0.62	0.02	0.29	0.00
24			12.82	29.50	8.08	9.59	5.04	3.04	3.83	1.57	2.44	0.52	1.67	0.21	1.12	0.08	0.68	0.02	0.31	0.00
26			13.89	34.21	8.75	11.12	5.46	3.53	4.15	1.82	2.64	0.60	1.81	0.24	1.22	0.09	0.74	0.03	0.34	0.00
28			14.96	39.25	9.42	12.76	5.88	4.05	4.47	2.08	2.85	0.69	1.95	0.27	1.31	0.11	0.79	0.03	0.37	0.00
30			16.02	44.60	10.10	14.50	6.30	4.60	4.79	2.37	3.05	0.79	2.08	0.31	1.41	0.12	0.85	0.04	0.39	0.01
35					11.78	19.29	7.35	6.12	5.59	3.15	3.56	1.05	2.43	0.42	1.64	0.16	0.99	0.05	0.46	0.01
40					13.46	24.70	8.40	7.84	6.39	4.03	4.07	1.34	2.78	0.53	1.87	0.20	1.13	0.06	0.52	0.01
45					15.15	30.72	9.45	9.75	7.19	5.01	4.58	1.67	3.13	0.66	2.11	0.25	1.28	0.07	0.59	0.01
50					16.83	37.34	10.50	11.85	7.99	6.09	5.08	2.03	3.47	0.80	2.34	0.31	1.42	0.09	0.65	0.01
55							11.55	14.13	8.79	7.27	5.59	2.42	3.82	0.96	2.58	0.37	1.56	0.11	0.72	0.02
60							12.60	16.60	9.59	8.54	6.10	2.85	4.17	1.13	2.81	0.43	1.70	0.13	0.79	0.02
65							13.65	19.26	10.39	9.91	6.61	3.30	4.52	1.31	3.05	0.50	1.84	0.15	0.85	0.02
70							14.70	22.09	11.18	11.37	7.12	3.79	4.86	1.50	3.28	0.57	1.98	0.17	0.92	0.03
75							15.75	25.10	11.98	12.91	7.63	4.30	5.21	1.70	3.51	0.65	2.13	0.19	0.98	0.03
80							16.80	28.29	12.78	14.55	8.14	4.85	5.56	1.92	3.75	0.74	2.27	0.22	1.05	0.03
85									13.58	16.28	8.64	5.42	5.91	2.15	3.98	0.82	2.41	0.24	1.11	0.04
90									14.38	18.10	9.15	6.03	6.25	2.39	4.22	0.92	2.55	0.27	1.18	0.04
95									15.18	20.01	9.66	6.67	6.60	2.64	4.45	1.01	2.69	0.30	1.24	0.05
100									15.98	22.00	10.17	7.33	6.95	2.90	4.69	1.11	2.83	0.33	1.31	0.05
110											11.19	8.74	7.64	3.46	5.15	1.33	3.12	0.39	1.44	0.06
120											12.20	10.27	8.34	4.07	5.62	1.56	3.40	0.46	1.57	0.07
130											13.22	11.92	9.03	4.72	6.09	1.81	3.68	0.53	1.70	0.08
140											14.24	13.67	9.73	5.41	6.56	2.07	3.97	0.61	1.83	0.09
150											15.25	15.53	10.42	6.15	7.03	2.36	4.25	0.69	1.96	0.11
160											16.27	17.50	11.12	6.93	7.50	2.66	4.54	0.78	2.09	0.12
170													11.81	7.76	7.96	2.97	4.82	0.87	2.22	0.13
180													12.51	8.62	8.43	3.30	5.10	0.97	2.36	0.15
190													13.20	9.53	8.90	3.65	5.39	1.08	2.49	0.16
200													13.90	10.48	9.37	4.02	5.67	1.18	2.62	0.18
225													15.64	13.03	10.54	4.99	6.38	1.47	2.94	0.22
250													17.37	15.84	11.71	6.07	7.09	1.79	3.27	0.27
275															12.88	7.24	7.79	2.13	3.60	0.33
300															14.06	8.51	8.50	2.50	3.93	0.38
325															15.23	9.87	9.21	2.91	4.25	0.44
350															16.40	11.32	9.92	3.33	4.58	0.51
375															17.57	12.86	10.63	3.79	4.91	0.58
400																	11.34	4.27	5.23	0.65
425																	12.05	4.77	5.56	0.73
450																	12.75	5.31	5.89	0.81
475																	13.46	5.87	6.22	0.89
500																	14.17	6.45	6.54	0.98
550																	15.59	7.70	7.20	1.17
600																	17.01	9.04	7.85	1.38

Note: Dark shaded area of chart indicates velocities over 5' per second. Use with caution

The velocity values were derived using the following equation  $V = \frac{0.408 \times$

PVC Schedule 40 IPS Plastic Pipe

(1120, 1220) C=150

psi Loss per 100 Feet of Pipe (psi/100 ft.)

Sizes 1/2" through 6" Flow 1 through 600 gpm

Nominal Size	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"										
Pipe OD	0.840	1.050	1.315	1.660	1.900	2.375	2.875	3.500	4.500	6.625										
Avg. ID	0.602	0.804	1.029	1.36	1.59	2.047	2.445	3.042	3.998	6.031										
Avg. Wall	0.119	0.123	0.143	0.150	0.155	0.164	0.215	0.229	0.251	0.297										
Tolerance	0.020	0.020	0.020	0.020	0.020	0.020	0.024	0.026	0.028	0.034										
Min. Wall	0.109	0.113	0.133	0.140	0.145	0.154	0.203	0.216	0.237	0.280										
Flow (gpm)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)				
1	1.13	0.50	0.63	0.12	0.39	0.04	0.22	0.01	0.16	0.00	0.10	0.00	0.07	0.00	0.04	0.00	0.03	0.00	0.01	0.00
2	2.25	1.82	1.26	0.44	0.77	0.13	0.44	0.03	0.32	0.02	0.19	0.00	0.14	0.00	0.09	0.00	0.05	0.00	0.02	0.00
3	3.38	3.85	1.89	0.94	1.16	0.28	0.66	0.07	0.48	0.03	0.29	0.01	0.20	0.00	0.13	0.00	0.08	0.00	0.03	0.00
4	4.50	6.55	2.52	1.60	1.54	0.48	0.88	0.12	0.65	0.06	0.39	0.02	0.27	0.01	0.18	0.00	0.10	0.00	0.04	0.00
5	5.63	9.91	3.16	2.42	1.93	0.73	1.10	0.19	0.81	0.09	0.49	0.03	0.34	0.01	0.22	0.00	0.13	0.00	0.06	0.00
6	6.75	13.89	3.79	3.40	2.31	1.02	1.32	0.26	0.97	0.12	0.58	0.04	0.41	0.02	0.26	0.01	0.15	0.00	0.07	0.00
7	7.88	18.48	4.42	4.52	2.70	1.36	1.54	0.35	1.13	0.16	0.68	0.05	0.48	0.02	0.31	0.01	0.18	0.00	0.08	0.00
8	9.01	23.66	5.05	5.79	3.08	1.74	1.76	0.45	1.29	0.21	0.78	0.06	0.55	0.03	0.35	0.01	0.20	0.00	0.09	0.00
9	10.13	29.43	5.68	7.20	3.47	2.17	1.99	0.56	1.45	0.26	0.88	0.08	0.61	0.03	0.40	0.01	0.23	0.00	0.10	0.00
10	11.26	35.77	6.31	8.75	3.85	2.63	2.21	0.68	1.61	0.32	0.97	0.09	0.68	0.04	0.44	0.01	0.26	0.00	0.11	0.00
11	12.38	42.68	6.94	10.44	4.24	3.14	2.43	0.81	1.78	0.38	1.07	0.11	0.75	0.05	0.48	0.02	0.28	0.00	0.12	0.00
12	13.51	50.14	7.57	12.27	4.62	3.69	2.65	0.95	1.94	0.44	1.17	0.13	0.82	0.05	0.53	0.02	0.31	0.01	0.13	0.00
14	15.76	66.71	8.84	16.32	5.39	4.91	3.09	1.26	2.26	0.59	1.36	0.17	0.96	0.07	0.62	0.03	0.36	0.01	0.16	0.00
16	18.01	85.42	10.10	20.90	6.17	6.29	3.53	1.62	2.58	0.76	1.56	0.22	1.09	0.09	0.71	0.03	0.41	0.01	0.18	0.00
18	20.26	106.24	11.36	25.99	6.94	7.82	3.97	2.01	2.90	0.94	1.75	0.28	1.23	0.12	0.79	0.04	0.46	0.01	0.20	0.00
20			12.62	31.59	7.71	9.51	4.41	2.45	3.23	1.14	1.95	0.33	1.36	0.14	0.88	0.05	0.51	0.01	0.22	0.00
22			13.89	37.69	8.48	11.35	4.85	2.92	3.55	1.37	2.14	0.40	1.50	0.17	0.97	0.06	0.56	0.02	0.25	0.00
24			15.15	44.28	9.25	13.33	5.29	3.43	3.87	1.60	2.34	0.47	1.64	0.20	1.06	0.07	0.61	0.02	0.27	0.00
26			16.41	51.36	10.02	15.46	5.74	3.98	4.20	1.86	2.53	0.54	1.77	0.23	1.15	0.08	0.66	0.02	0.29	0.00
28			17.67	58.91	10.79	17.73	6.18	4.56	4.52	2.13	2.73	0.62	1.91	0.26	1.23	0.09	0.71	0.02	0.31	0.00
30			18.94	66.94	11.56	20.15	6.62	5.19	4.84	2.42	2.92	0.71	2.05	0.30	1.32	0.10	0.77	0.03	0.34	0.00
35					13.49	26.81	7.72	6.90	5.65	3.23	3.41	0.94	2.39	0.40	1.54	0.14	0.89	0.04	0.39	0.00
40					15.41	34.33	8.82	8.84	6.46	4.13	3.89	1.21	2.73	0.51	1.76	0.18	1.02	0.05	0.45	0.01
45					17.34	42.70	9.93	10.99	7.26	5.14	4.38	1.50	3.07	0.63	1.98	0.22	1.15	0.06	0.50	0.01
50					19.27	51.90	11.03	13.36	8.07	6.25	4.87	1.83	3.41	0.77	2.20	0.27	1.28	0.07	0.56	0.01
55							12.13	15.94	8.88	7.45	5.36	2.18	3.75	0.92	2.42	0.32	1.40	0.08	0.62	0.01
60							13.24	18.72	9.68	8.75	5.84	2.56	4.09	1.08	2.65	0.37	1.53	0.10	0.67	0.01
65							14.34	21.72	10.49	10.15	6.33	2.97	4.44	1.25	2.87	0.43	1.66	0.11	0.73	0.02
70							15.44	24.91	11.30	11.65	6.82	3.41	4.78	1.43	3.09	0.50	1.79	0.13	0.79	0.02
75							16.54	28.31	12.10	13.23	7.30	3.87	5.12	1.63	3.31	0.56	1.91	0.15	0.84	0.02
80							17.65	31.90	12.91	14.91	7.79	4.36	5.46	1.84	3.53	0.63	2.04	0.17	0.90	0.02
85							18.75	35.69	13.72	16.69	8.28	4.88	5.80	2.06	3.75	0.71	2.17	0.19	0.95	0.03
90							19.85	39.67	14.52	18.55	8.76	5.43	6.14	2.29	3.97	0.79	2.30	0.21	1.01	0.03
95									15.33	20.50	9.25	6.00	6.48	2.53	4.19	0.87	2.42	0.23	1.07	0.03
100									16.14	22.55	9.74	6.59	6.82	2.78	4.41	0.96	2.55	0.25	1.12	0.03
110									17.75	26.90	10.71	7.87	7.51	3.31	4.85	1.14	2.81	0.30	1.23	0.04
120									19.37	31.60	11.68	9.24	8.19	3.89	5.29	1.34	3.06	0.36	1.35	0.05
130											12.66	10.72	8.87	4.52	5.73	1.56	3.32	0.41	1.46	0.06
140											13.63	12.30	9.55	5.18	6.17	1.79	3.57	0.47	1.57	0.06
150											14.61	13.97	10.24	5.89	6.61	2.03	3.83	0.54	1.68	0.07
160											15.58	15.75	10.92	6.63	7.05	2.29	4.08	0.61	1.79	0.08
170											16.55	17.62	11.60	7.42	7.50	2.56	4.34	0.68	1.91	0.09
180											17.53	19.58	12.28	8.25	7.94	2.85	4.59	0.75	2.02	0.10
190											18.50	21.65	12.97	9.12	8.38	3.15	4.85	0.83	2.13	0.11
200											19.47	23.80	13.65	10.03	8.82	3.46	5.11	0.92	2.24	0.12
225													15.36	12.47	9.92	4.31	5.74	1.14	2.52	0.15
250													17.06	15.16	11.02	5.24	6.38	1.39	2.80	0.19
275													18.77	18.09	12.12	6.25	7.02	1.65	3.08	0.22
300															13.23	7.34	7.66	1.94	3.37	0.26
325															14.33	8.51	8.30	2.25	3.65	0.30
350															15.43	9.76	8.93	2.58	3.93	0.35
375															16.53	11.09	9.57	2.93	4.21	0.40
400															17.64	12.50	10.21	3.31	4.49	0.45
425															18.74	13.99	10.85	3.70	4.77	0.50
450															19.84	15.55	11.49	4.11	5.05	0.56
475																	12.12	4.55	5.33	0.62
500																	12.76	5.00	5.61	0.68
550																	14.04	5.97	6.17	0.81
600																	15.32	7.01	6.73	0.95

Note: Dark shaded area of chart indicates velocities over 5' per second. Use with caution

The velocity values were derived using the following equation  $V = \frac{0.408 \times Q_{gpm}}{d^2}$

Table are based upon the following Hazen-Williams equation:  $H_f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \times \frac{Q_{gpm}^{1.852}}{D_{in}^{$



PVC Schedule 80 IPS Plastic Pipe																				
(1120, 1220) C=150																				
psi Loss per 100 Feet of Pipe (psi/100 ft.)																				
Sizes 1/2" through 6" Flow 1 through 600 gpm																				
Nominal Size	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
Pipe OD	0.840		1.050		1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
Avg. ID	0.526		0.722		0.935		1.254		1.476		1.913		2.289		2.864		3.786		5.709	
Avg. Wall	0.157		0.164		0.190		0.203		0.212		0.231		0.293		0.318		0.357		0.458	
Tolerance	0.020		0.020		0.022		0.024		0.024		0.026		0.034		0.036		0.040		0.052	
Min. Wall	0.147		0.154		0.179		0.191		0.200		0.218		0.276		0.300		0.337		0.432	
Flow (gpm)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)		
1	1.47	0.97	0.78	0.21	0.47	0.06	0.26	0.01	0.19	0.01	0.11	0.00	0.08	0.00	0.05	0.00	0.03	0.00	0.01	0.00
2	2.95	3.50	1.57	0.75	0.93	0.21	0.52	0.05	0.37	0.02	0.22	0.01	0.16	0.00	0.10	0.00	0.06	0.00	0.03	0.00
3	4.42	7.42	2.35	1.59	1.40	0.45	0.78	0.11	0.56	0.05	0.33	0.01	0.23	0.01	0.15	0.00	0.09	0.00	0.04	0.00
4	5.90	12.64	3.13	2.71	1.87	0.77	1.04	0.18	0.75	0.08	0.45	0.02	0.31	0.01	0.20	0.00	0.11	0.00	0.05	0.00
5	7.37	19.11	3.91	4.09	2.33	1.16	1.30	0.28	0.94	0.13	0.56	0.04	0.39	0.01	0.25	0.01	0.14	0.00	0.06	0.00
6	8.85	26.78	4.70	5.74	2.80	1.63	1.56	0.39	1.12	0.18	0.67	0.05	0.47	0.02	0.30	0.01	0.17	0.00	0.08	0.00
7	10.32	35.63	5.48	7.63	3.27	2.17	1.82	0.52	1.31	0.24	0.78	0.07	0.55	0.03	0.35	0.01	0.20	0.00	0.09	0.00
8	11.80	45.63	6.26	9.77	3.73	2.78	2.08	0.67	1.50	0.30	0.89	0.09	0.62	0.04	0.40	0.01	0.23	0.00	0.10	0.00
9	13.27	56.75	7.04	12.15	4.20	3.45	2.34	0.83	1.69	0.37	1.00	0.11	0.70	0.04	0.45	0.01	0.26	0.00	0.11	0.00
10	14.75	68.98	7.83	14.77	4.67	4.20	2.59	1.01	1.87	0.46	1.11	0.13	0.78	0.05	0.50	0.02	0.28	0.00	0.13	0.00
11			8.61	17.62	5.13	5.01	2.85	1.20	2.06	0.54	1.23	0.15	0.86	0.06	0.55	0.02	0.31	0.01	0.14	0.00
12			9.39	20.70	5.60	5.88	3.11	1.41	2.25	0.64	1.34	0.18	0.93	0.08	0.60	0.03	0.34	0.01	0.15	0.00
14			10.96	27.55	6.53	7.83	3.63	1.88	2.62	0.85	1.56	0.24	1.09	0.10	0.70	0.03	0.40	0.01	0.18	0.00
16			12.52	35.27	7.47	10.03	4.15	2.40	3.00	1.09	1.78	0.31	1.25	0.13	0.80	0.04	0.46	0.01	0.20	0.00
18			14.09	43.87	8.40	12.47	4.67	2.99	3.37	1.35	2.01	0.38	1.40	0.16	0.90	0.05	0.51	0.01	0.23	0.00
20			15.65	53.32	9.33	15.16	5.19	3.63	3.75	1.64	2.23	0.47	1.56	0.19	0.99	0.07	0.57	0.02	0.25	0.00
22					10.27	18.08	5.71	4.33	4.12	1.96	2.45	0.56	1.71	0.23	1.09	0.08	0.63	0.02	0.28	0.00
24					11.20	21.24	6.23	5.09	4.49	2.30	2.68	0.65	1.87	0.27	1.19	0.09	0.68	0.02	0.30	0.00
26					12.13	24.64	6.75	5.91	4.87	2.67	2.90	0.76	2.02	0.32	1.29	0.11	0.74	0.03	0.33	0.00
28					13.07	28.26	7.26	6.77	5.24	3.06	3.12	0.87	2.18	0.36	1.39	0.12	0.80	0.03	0.35	0.00
30					14.00	32.12	7.78	7.70	5.62	3.48	3.34	0.99	2.34	0.41	1.49	0.14	0.85	0.04	0.38	0.00
35					16.33	42.73	9.08	10.24	6.55	4.63	3.90	1.31	2.73	0.55	1.74	0.18	1.00	0.05	0.44	0.01
40					10.38	13.11	7.49	5.93	4.46	1.68	3.11	0.70	1.99	0.24	1.14	0.06	0.50	0.01		
45					11.68	16.31	8.43	7.38	5.02	2.09	3.50	0.87	2.24	0.29	1.28	0.08	0.56	0.01		
50					12.97	19.83	9.36	8.97	5.57	2.54	3.89	1.06	2.49	0.36	1.42	0.09	0.63	0.01		
55					14.27	23.65	10.30	10.70	6.13	3.03	4.28	1.27	2.74	0.43	1.57	0.11	0.69	0.01		
60					15.57	27.79	11.24	12.57	6.69	3.56	4.67	1.49	2.98	0.50	1.71	0.13	0.75	0.02		
65					12.17	14.58	7.25	4.13	5.06	1.72	3.23	0.58	1.85	0.15	0.81	0.02				
70					13.11	16.73	7.80	4.74	5.45	1.98	3.48	0.66	1.99	0.17	0.88	0.02				
75					14.05	19.01	8.36	5.38	5.84	2.25	3.73	0.76	2.13	0.19	0.94	0.03				
80					14.98	21.42	8.92	6.06	6.23	2.53	3.98	0.85	2.28	0.22	1.00	0.03				
85					15.92	23.96	9.48	6.78	6.62	2.83	4.23	0.95	2.42	0.24	1.06	0.03				
90							10.03	7.54	7.01	3.15	4.48	1.06	2.56	0.27	1.13	0.04				
95							10.59	8.34	7.40	3.48	4.73	1.17	2.70	0.30	1.19	0.04				
100							11.15	9.17	7.79	3.83	4.97	1.29	2.85	0.33	1.25	0.04				
110							12.26	10.94	8.57	4.57	5.47	1.53	3.13	0.39	1.38	0.05				
120							13.38	12.85	9.34	5.37	5.97	1.80	3.42	0.46	1.50	0.06				
130							14.49	14.90	10.12	6.22	6.47	2.09	3.70	0.54	1.63	0.07				
140							15.61	17.09	10.90	7.14	6.96	2.40	3.98	0.62	1.75	0.08				
150							11.68	8.11	7.46	2.73	4.27	0.70	1.88	0.10						
160							12.46	9.14	7.96	3.07	4.55	0.79	2.00	0.11						
170							13.24	10.23	8.46	3.44	4.84	0.88	2.13	0.12						
180							14.02	11.37	8.95	3.82	5.12	0.98	2.25	0.13						
190							14.80	12.57	9.45	4.22	5.41	1.09	2.38	0.15						
200							15.57	13.82	9.95	4.64	5.69	1.19	2.50	0.16						
225													11.19	5.78	6.40	1.49	2.82	0.20		
250													12.44	7.02	7.12	1.81	3.13	0.24		
275													13.68	8.38	7.83	2.15	3.44	0.29		
300													14.92	9.84	8.54	2.53	3.76	0.34		
325													16.17	11.41	9.25	2.94	4.07	0.40		
350													9.96	3.37	4.38	0.46				
375													10.67	3.83	4.69	0.52				
400													11.39	4.31	5.01	0.58				
425													12.10	4.82	5.32	0.65				
450													12.81	5.36	5.63	0.73				
475													13.52	5.93	5.95	0.80				
500													14.23	6.52	6.26	0.88				
550															6.88	1.05				
600															7.51	1.24				

Note: Dark shaded area of chart indicates velocities over 5' per second. Use with caution

The velocity values were derived using the following equation  $V = \frac{0.408 \times Q_{gpm}}{d^2}$

Table are based upon the following Hazen-Williams equation:  $H_f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \times \frac{Q^{1.852}}{D^{4.8655}}$  for change in psi per foot of elevation. Pressure loss for uphill elevation and pressure gain for downhill elevation changes.

**Polyethylene (PE) SDR Pressure Rated Tube**

(2306, 3206, 3306) SDR 7, 9, 11.5, 15 C=140

psi Loss per 100 Feet of Pipe (psi/100 ft.)

Sizes 1/2" through 4" Flow 1 through 600 gpm

Nominal Size	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"	
Avg. I.D.	0.622		0.824		1.049		1.380		1.610		2.067		2.469		3.068		4.026	
Flow (gpm)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)
1	1.05	0.49	0.60	0.12	0.37	0.04	0.21	0.01	0.16	0.00	0.10	0.00	0.07	0.00	0.04	0.00	0.03	0.00
2	2.11	1.76	1.20	0.45	0.74	0.14	0.43	0.04	0.31	0.02	0.19	0.01	0.13	0.00	0.09	0.00	0.05	0.00
3	3.16	3.73	1.80	0.95	1.11	0.29	0.64	0.08	0.47	0.04	0.29	0.01	0.20	0.00	0.13	0.00	0.08	0.00
4	4.22	6.35	2.40	1.62	1.48	0.50	0.86	0.13	0.63	0.06	0.38	0.02	0.27	0.01	0.17	0.00	0.10	0.00
5	5.27	9.60	3.00	2.44	1.85	0.76	1.07	0.20	0.79	0.09	0.48	0.03	0.33	0.01	0.22	0.00	0.13	0.00
6	6.33	13.46	3.61	3.43	2.22	1.06	1.29	0.28	0.94	0.13	0.57	0.04	0.40	0.02	0.26	0.01	0.15	0.00
7	7.38	17.91	4.21	4.56	2.60	1.41	1.50	0.37	1.10	0.18	0.67	0.05	0.47	0.02	0.30	0.01	0.18	0.00
8	8.44	22.93	4.81	5.84	2.97	1.80	1.71	0.47	1.26	0.22	0.76	0.07	0.54	0.03	0.35	0.01	0.20	0.00
9	9.49	28.52	5.41	7.26	3.34	2.24	1.93	0.59	1.42	0.28	0.86	0.08	0.60	0.03	0.39	0.01	0.23	0.00
10	10.55	34.67	6.01	8.82	3.71	2.73	2.14	0.72	1.57	0.34	0.95	0.10	0.67	0.04	0.43	0.01	0.25	0.00
11			6.61	10.53	4.08	3.25	2.36	0.86	1.73	0.40	1.05	0.12	0.74	0.05	0.48	0.02	0.28	0.00
12			7.21	12.37	4.45	3.82	2.57	1.01	1.89	0.48	1.15	0.14	0.80	0.06	0.52	0.02	0.30	0.01
14			8.41	16.45	5.19	5.08	3.00	1.34	2.20	0.63	1.34	0.19	0.94	0.08	0.61	0.03	0.35	0.01
16			9.61	21.07	5.93	6.51	3.43	1.71	2.52	0.81	1.53	0.24	1.07	0.10	0.69	0.04	0.40	0.01
18			10.82	26.21	6.67	8.10	3.86	2.13	2.83	1.01	1.72	0.30	1.20	0.13	0.78	0.04	0.45	0.01
20			12.02	31.85	7.42	9.84	4.28	2.59	3.15	1.22	1.91	0.36	1.34	0.15	0.87	0.05	0.50	0.01
22					8.16	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					8.90	13.79	5.14	3.63	3.78	1.72	2.29	0.51	1.61	0.21	1.04	0.07	0.60	0.02
26					9.64	16.00	5.57	4.21	4.09	1.99	2.48	0.59	1.74	0.25	1.13	0.09	0.65	0.02
28					10.38	18.35	6.00	4.83	4.41	2.28	2.67	0.68	1.87	0.28	1.21	0.10	0.70	0.03
30					11.12	20.85	6.43	5.49	4.72	2.59	2.86	0.77	2.01	0.32	1.30	0.11	0.76	0.03
35					12.98	27.74	7.50	7.30	5.51	3.45	3.34	1.02	2.34	0.43	1.52	0.15	0.88	0.04
40							8.57	9.35	6.30	4.42	3.82	1.31	2.68	0.55	1.73	0.19	1.01	0.05
45							9.64	11.63	7.08	5.49	4.30	1.63	3.01	0.69	1.95	0.24	1.13	0.06
50							10.71	14.14	7.87	6.68	4.77	1.98	3.35	0.83	2.17	0.29	1.26	0.08
55							11.78	16.87	8.66	7.97	5.25	2.36	3.68	0.99	2.38	0.35	1.38	0.09
60							12.85	19.82	9.44	9.36	5.73	2.77	4.02	1.17	2.60	0.41	1.51	0.11
65									10.23	10.86	6.21	3.22	4.35	1.36	2.82	0.47	1.64	0.13
70									11.02	12.45	6.68	3.69	4.69	1.55	3.03	0.54	1.76	0.14
75									11.81	14.15	7.16	4.19	5.02	1.77	3.25	0.61	1.89	0.16
80									12.59	15.95	7.64	4.73	5.35	1.99	3.47	0.69	2.01	0.18
85									13.38	17.84	8.12	5.29	5.69	2.23	3.68	0.77	2.14	0.21
90											8.59	5.88	6.02	2.48	3.90	0.86	2.27	0.23
95											9.07	6.50	6.36	2.74	4.12	0.95	2.39	0.25
100											9.55	7.15	6.69	3.01	4.33	1.05	2.52	0.28
110											10.50	8.53	7.36	3.59	4.77	1.25	2.77	0.33
120											11.46	10.02	8.03	4.22	5.20	1.47	3.02	0.39
130											12.41	11.62	8.70	4.89	5.63	1.70	3.27	0.45
140											13.37	13.33	9.37	5.61	6.07	1.95	3.52	0.52
150													10.04	6.38	6.50	2.22	3.78	0.59
160													10.71	7.19	6.94	2.50	4.03	0.67
170													11.38	8.04	7.37	2.79	4.28	0.74
180													12.05	8.94	7.80	3.11	4.53	0.83
190													12.72	9.88	8.24	3.43	4.78	0.92
200													13.39	10.87	8.67	3.78	5.03	1.01
225															9.75	4.70	5.66	1.25
250															10.84	5.71	6.29	1.52
275															11.92	6.81	6.92	1.81
300															13.00	8.00	7.55	2.13
325															14.09	9.28	8.18	2.47
350																	8.81	2.84
375																	9.44	3.22
400																	10.07	3.63
425																	10.70	4.06
450																	11.33	4.52
475																	11.96	4.99
500																	12.59	5.49
550																	13.84	6.55
600																	15.10	7.70

**Note:** Dark shaded area of chart indicates velocities over 5' per second. Use with caution

The velocity values were derived using the following equation  $V = \frac{0.408 \times Q_{gpm}}{d^2}$

Table are based upon the following Hazen-Williams equation:  $H_f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \times \frac{Q^{1.852}}{D^{4.8655}}$  for change in psi per foot of elevation. Pressure loss for uphill elevation and pressure gain for downhill elevation changes.

**Schedule 40 Standard Steel Pipe**

C=100

psi Loss per 100 Feet of Pipe (psi/100 ft.)

Sizes 1/2" through 6" Flow 1 through 600 gpm

Nominal Size	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"		4"		6"	
Pipe OD	0.840		1.050		1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
Avg. ID	0.622		0.824		1.049		1.380		1.610		2.067		2.469		3.068		4.026		6.065	
Avg. Wall	0.109		0.113		0.133		0.140		0.145		0.154		0.203		0.216		0.237		0.280	
Flow (gpm)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)
1	1.05	0.91	0.60	0.23	0.37	0.07	0.21	0.02	0.16	0.01	0.10	0.00	0.07	0.00	0.04	0.00	0.03	0.00	0.01	0.00
2	2.11	3.28	1.20	0.84	0.74	0.26	0.43	0.07	0.31	0.03	0.19	0.01	0.13	0.00	0.09	0.00	0.05	0.00	0.02	0.00
3	3.16	6.95	1.80	1.77	1.11	0.55	0.64	0.14	0.47	0.07	0.29	0.02	0.20	0.01	0.13	0.00	0.08	0.00	0.03	0.00
4	4.22	11.85	2.40	3.02	1.48	0.93	0.86	0.25	0.63	0.12	0.38	0.03	0.27	0.01	0.17	0.01	0.10	0.00	0.04	0.00
5	5.27	17.91	3.00	4.56	1.85	1.41	1.07	0.37	0.79	0.18	0.48	0.05	0.33	0.02	0.22	0.01	0.13	0.00	0.06	0.00
6	6.33	25.10	3.61	6.39	2.22	1.97	1.29	0.52	0.94	0.25	0.57	0.07	0.40	0.03	0.26	0.01	0.15	0.00	0.07	0.00
7	7.38	33.40	4.21	8.50	2.60	2.63	1.50	0.69	1.10	0.33	0.67	0.10	0.47	0.04	0.30	0.01	0.18	0.00	0.08	0.00
8	8.44	42.77	4.81	10.88	2.97	3.36	1.71	0.89	1.26	0.42	0.76	0.12	0.54	0.05	0.35	0.02	0.20	0.00	0.09	0.00
9	9.49	53.19	5.41	13.54	3.34	4.18	1.93	1.10	1.42	0.52	0.86	0.15	0.60	0.06	0.39	0.02	0.23	0.01	0.10	0.00
10	10.55	64.65	6.01	16.45	3.71	5.08	2.14	1.34	1.57	0.63	0.95	0.19	0.67	0.08	0.43	0.03	0.25	0.01	0.11	0.00
11	11.60	77.14	6.61	19.63	4.08	6.06	2.36	1.60	1.73	0.75	1.05	0.22	0.74	0.09	0.48	0.03	0.28	0.01	0.12	0.00
12	12.65	90.62	7.21	23.06	4.45	7.12	2.57	1.88	1.89	0.89	1.15	0.26	0.80	0.11	0.52	0.04	0.30	0.01	0.13	0.00
14			8.41	30.68	5.19	9.48	3.00	2.50	2.20	1.18	1.34	0.35	0.94	0.15	0.61	0.05	0.35	0.01	0.16	0.00
16			9.61	39.29	5.93	12.14	3.43	3.20	2.52	1.51	1.53	0.45	1.07	0.19	0.69	0.07	0.40	0.02	0.18	0.00
18			10.82	48.87	6.67	15.10	3.86	3.97	2.83	1.88	1.72	0.56	1.20	0.23	0.78	0.08	0.45	0.02	0.20	0.00
20			12.02	59.40	7.42	18.35	4.28	4.83	3.15	2.28	1.91	0.68	1.34	0.28	0.87	0.10	0.50	0.03	0.22	0.00
22			13.22	70.87	8.16	21.89	4.71	5.76	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			8.90	25.72	5.14	6.77	3.78	3.20	2.29	0.95	1.61	0.40	1.04	0.14	0.60	0.04	0.40	0.02	0.27	0.01
26			9.64	29.83	5.57	7.85	4.09	3.71	2.48	1.10	1.74	0.46	1.13	0.16	0.65	0.04	0.45	0.02	0.29	0.01
28			10.38	34.22	6.00	9.01	4.41	4.25	2.67	1.26	1.87	0.53	1.21	0.18	0.70	0.05	0.50	0.03	0.31	0.01
30			11.12	38.88	6.43	10.24	4.72	4.83	2.86	1.43	2.01	0.60	1.30	0.21	0.76	0.06	0.55	0.03	0.33	0.01
35			12.98	51.72	7.50	13.62	5.51	6.43	3.34	1.91	2.34	0.80	1.52	0.28	0.88	0.07	0.65	0.04	0.39	0.01
40			8.57	17.44	6.30	8.24	3.82	2.44	2.68	1.03	2.68	1.03	1.73	0.36	1.01	0.10	0.70	0.05	0.44	0.01
45			9.64	21.69	7.08	10.25	4.30	3.04	3.01	1.28	3.01	1.28	1.95	0.44	1.13	0.12	0.80	0.06	0.50	0.02
50			10.71	26.36	7.87	12.45	4.77	3.69	3.35	1.55	3.35	1.55	2.17	0.54	1.26	0.14	0.90	0.07	0.55	0.02
55			11.78	31.45	8.66	14.86	5.25	4.40	3.68	1.85	3.68	1.85	2.38	0.64	1.38	0.17	1.00	0.08	0.61	0.02
60			12.85	36.95	9.44	17.45	5.73	5.17	4.02	2.18	4.02	2.18	2.60	0.76	1.51	0.20	1.10	0.09	0.67	0.03
65			13.93	42.86	10.23	20.24	6.21	6.00	4.35	2.53	4.35	2.53	2.82	0.88	1.64	0.23	1.20	0.10	0.72	0.03
70			11.02	23.22	6.68	6.88	4.69	2.90	3.03	1.01	4.69	2.90	3.03	1.01	1.76	0.27	1.30	0.11	0.78	0.04
75			11.81	26.39	7.16	7.82	5.02	3.29	3.25	1.14	5.02	3.29	3.25	1.14	1.89	0.31	1.40	0.12	0.83	0.04
80			12.59	29.74	7.64	8.82	5.35	3.71	3.47	1.29	5.35	3.71	3.47	1.29	2.01	0.34	1.50	0.13	0.89	0.05
85			13.38	33.27	8.12	9.86	5.69	4.15	3.68	1.44	5.69	4.15	3.68	1.44	2.14	0.38	1.60	0.14	0.94	0.05
90			8.59	10.96	6.02	4.62	3.90	1.60	2.27	0.43	6.02	4.62	3.90	1.60	2.27	0.43	1.70	0.15	1.00	0.06
95			9.07	12.12	6.36	5.10	4.12	1.77	2.39	0.47	6.36	5.10	4.12	1.77	2.39	0.47	1.80	0.16	1.05	0.06
100			9.55	13.33	6.69	5.61	4.33	1.95	2.52	0.52	6.69	5.61	4.33	1.95	2.52	0.52	1.90	0.17	1.11	0.07
110			10.50	15.90	7.36	6.70	4.77	2.33	2.77	0.62	7.36	6.70	4.77	2.33	2.77	0.62	2.00	0.18	1.22	0.08
120			11.46	18.68	8.03	7.87	5.20	2.73	3.02	0.73	8.03	7.87	5.20	2.73	3.02	0.73	2.10	0.19	1.33	0.10
130			12.41	21.66	8.70	9.12	5.63	3.17	3.27	0.85	8.70	9.12	5.63	3.17	3.27	0.85	2.20	0.20	1.44	0.12
140			13.37	24.85	9.37	10.47	6.07	3.64	3.52	0.97	9.37	10.47	6.07	3.64	3.52	0.97	2.30	0.21	1.55	0.13
150			10.04	11.89	6.50	4.13	3.78	1.10	1.66	0.15	10.04	11.89	6.50	4.13	3.78	1.10	2.40	0.22	1.66	0.15
160			10.71	13.40	6.94	4.66	4.03	1.24	1.77	0.17	10.71	13.40	6.94	4.66	4.03	1.24	2.50	0.23	1.77	0.17
170			11.38	15.00	7.37	5.21	4.28	1.39	1.89	0.19	11.38	15.00	7.37	5.21	4.28	1.39	2.60	0.24	1.89	0.19
180			12.05	16.67	7.80	5.79	4.53	1.54	2.00	0.21	12.05	16.67	7.80	5.79	4.53	1.54	2.70	0.25	2.00	0.21
190			12.72	18.43	8.24	6.40	4.78	1.71	2.11	0.23	12.72	18.43	8.24	6.40	4.78	1.71	2.80	0.26	2.11	0.23
200			13.39	20.26	8.67	7.04	5.03	1.88	2.22	0.26	13.39	20.26	8.67	7.04	5.03	1.88	2.90	0.27	2.22	0.26
225			9.75	8.76	5.66	2.33	2.50	0.32			9.75	8.76	5.66	2.33	2.50	0.32				
250			10.84	10.64	6.29	2.84	2.77	0.39			10.84	10.64	6.29	2.84	2.77	0.39				
275			11.92	12.70	6.92	3.38	3.05	0.46			11.92	12.70	6.92	3.38	3.05	0.46				
300			13.00	14.92	7.55	3.98	3.33	0.54			13.00	14.92	7.55	3.98	3.33	0.54				
325			8.18	4.61	3.60	0.63					8.18	4.61	3.60	0.63						
350			8.81	5.29	3.88	0.72					8.81	5.29	3.88	0.72						
375			9.44	6.01	4.16	0.82					9.44	6.01	4.16	0.82						
400			10.07	6.77	4.44	0.92					10.07	6.77	4.44	0.92						
425			10.70	7.58	4.71	1.03					10.70	7.58	4.71	1.03						
450			11.33	8.43	4.99	1.15					11.33	8.43	4.99	1.15						
475			11.96	9.31	5.27	1.27					11.96	9.31	5.27	1.27						
500			12.59	10.24	5.55	1.39					12.59	10.24	5.55	1.39						
550					6.10	1.66							6.10	1.66						
600					6.66	1.95							6.66	1.95						

Note: Dark shaded area of chart indicates velocities over 7" per second. Use with caution

The velocity values were derived using the following equation  $V = \frac{0.408 \times Q_{gpm}}{d^2}$

Table are based upon the following Hazen-Williams equation:  $H_f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \times \frac{Q^{1.852}}{D^{4.8655}}$  for change in psi per foot of elevation. Pressure loss for uphill elevation and pressure gain for downhill elevation changes.

Type K Copper Water Tube

C=140

psi Loss per 100 Feet of Tube (psi/100 ft.)

Sizes 1/2" through 3" Flow 1 through 600 gpm

Nominal Size	1/2"		5/8"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"	
Pipe OD	0.625	0.625	0.750	0.652	0.875	0.745	1.125	0.995	1.375	1.245	1.625	1.481	2.125	1.959	2.625	2.435	3.125	2.907
Avg. ID	0.5270	0.5270	0.652	0.652	0.745	0.745	0.995	0.995	1.245	1.245	1.481	1.481	1.959	1.959	2.435	2.435	2.907	2.907
Avg. Wall	0.049	0.049	0.049	0.049	0.065	0.065	0.065	0.065	0.065	0.065	0.072	0.072	0.083	0.083	0.095	0.095	0.109	0.109
Flow (gpm)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)	Velocity (ft/s)	Loss (psi)
1	1.47	1.09	0.96	0.39	0.74	0.20	0.41	0.05	0.26	0.02	0.19	0.01	0.11	0.00	0.07	0.00	0.05	0.00
2	2.94	3.94	1.92	1.40	1.47	0.73	0.82	0.18	0.53	0.06	0.37	0.03	0.21	0.01	0.14	0.00	0.10	0.00
3	4.41	8.35	2.88	2.97	2.21	1.55	1.24	0.38	0.79	0.13	0.56	0.05	0.32	0.01	0.21	0.00	0.14	0.00
4	5.88	14.23	3.84	5.05	2.94	2.64	1.65	0.65	1.05	0.22	0.74	0.09	0.43	0.02	0.28	0.01	0.19	0.00
5	7.35	21.51	4.80	7.64	3.68	3.99	2.06	0.98	1.32	0.33	0.93	0.14	0.53	0.04	0.34	0.01	0.24	0.01
6	8.81	30.15	5.76	10.70	4.41	5.59	2.47	1.37	1.58	0.46	1.12	0.20	0.64	0.05	0.41	0.02	0.29	0.01
7	10.28	40.12	6.72	14.24	5.15	7.44	2.88	1.82	1.84	0.61	1.30	0.26	0.74	0.07	0.48	0.02	0.34	0.01
8	11.75	51.37	7.68	18.24	5.88	9.53	3.30	2.33	2.11	0.78	1.49	0.34	0.85	0.09	0.55	0.03	0.39	0.01
9	13.22	63.90	8.64	22.68	6.62	11.85	3.71	2.90	2.37	0.97	1.67	0.42	0.96	0.11	0.62	0.04	0.43	0.02
10	14.69	77.66	9.60	27.57	7.35	14.41	4.12	3.52	2.63	1.18	1.86	0.51	1.06	0.13	0.69	0.05	0.48	0.02
11			10.56	32.89	8.09	17.19	4.53	4.21	2.90	1.41	2.05	0.61	1.17	0.16	0.76	0.05	0.53	0.02
12			11.52	38.64	8.82	20.20	4.95	4.94	3.16	1.66	2.23	0.71	1.28	0.18	0.83	0.06	0.58	0.03
14			13.44	51.41	10.29	26.87	5.77	6.57	3.69	2.21	2.60	0.95	1.49	0.24	0.96	0.08	0.68	0.04
16			15.36	65.83	11.76	34.41	6.59	8.42	4.21	2.83	2.98	1.22	1.70	0.31	1.10	0.11	0.77	0.05
18			17.28	81.88	13.23	42.80	7.42	10.47	4.74	3.52	3.35	1.51	1.91	0.39	1.24	0.13	0.87	0.06
20					14.70	52.02	8.24	12.72	5.26	4.28	3.72	1.84	2.13	0.47	1.38	0.16	0.97	0.07
22					16.17	62.06	9.07	15.18	5.79	5.10	4.09	2.19	2.34	0.56	1.51	0.19	1.06	0.08
24					17.64	72.91	9.89	17.84	6.32	5.99	4.46	2.58	2.55	0.66	1.65	0.23	1.16	0.10
26							10.71	20.69	6.84	6.95	4.84	2.99	2.76	0.77	1.79	0.27	1.26	0.11
28							11.54	23.73	7.37	7.97	5.21	3.43	2.98	0.88	1.93	0.30	1.35	0.13
30							12.36	26.96	7.90	9.06	5.58	3.89	3.19	1.00	2.06	0.35	1.45	0.15
35							14.42	35.87	9.21	12.05	6.51	5.18	3.72	1.33	2.41	0.46	1.69	0.19
40							16.48	45.94	10.53	15.43	7.44	6.63	4.25	1.70	2.75	0.59	1.93	0.25
45									11.84	19.20	8.37	8.25	4.78	2.11	3.10	0.73	2.17	0.31
50									13.16	23.33	9.30	10.03	5.32	2.57	3.44	0.89	2.41	0.38
55									14.48	27.84	10.23	11.96	5.85	3.07	3.78	1.06	2.66	0.45
60									15.79	32.70	11.16	14.05	6.38	3.60	4.13	1.25	2.90	0.53
65									17.11	37.93	12.09	16.30	6.91	4.18	4.47	1.45	3.14	0.61
70									18.43	43.51	13.02	18.70	7.44	4.79	4.82	1.66	3.38	0.70
75											13.95	21.24	7.97	5.45	5.16	1.89	3.62	0.80
80											14.88	23.94	8.51	6.14	5.50	2.13	3.86	0.90
85											15.81	26.79	9.04	6.87	5.85	2.38	4.10	1.01
90											16.74	29.78	9.57	7.63	6.19	2.65	4.35	1.12
95											17.67	32.91	10.10	8.44	6.54	2.93	4.59	1.24
100											18.60	36.19	10.63	9.28	6.88	3.22	4.83	1.36
110													11.69	11.07	7.57	3.84	5.31	1.62
120													12.76	13.01	8.26	4.51	5.79	1.91
130													13.82	15.08	8.95	5.23	6.28	2.21
140													14.88	17.30	9.63	6.00	6.76	2.54
150													15.95	19.66	10.32	6.82	7.24	2.88
160													17.01	22.16	11.01	7.69	7.72	3.25
170													18.07	24.79	11.70	8.60	8.21	3.63
180															12.39	9.56	8.69	4.04
190															13.07	10.57	9.17	4.46
200															13.76	11.62	9.66	4.91
225															15.48	14.46	10.86	6.10
250															17.20	17.57	12.07	7.42
275															18.92	20.96	13.28	8.85
300																	14.48	10.40
325																	15.69	12.06
350																	16.90	13.84
375																	18.11	15.72
400																	19.31	17.72
425																		
450																		
475																		
500																		
550																		

**Note:** Dark shaded area of chart indicates velocities over 7' per second. Use with caution

The velocity values were derived using the following equation  $V = \frac{0.408 \times Q_{gpm}}{d^2}$

Table are based upon the following Hazen-Williams equation:  $H_f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \times \frac{Q^{1.852}}{D^{4.8655}}$  for change in psi per foot of elevation. Pressure loss for uphill elevation and pressure gain for downhill elevation changes.