

PIPELINE SIZE AND VOLUME

A. Actual Inside Diameter (Inches)

Nominal Pipe Size (inches)	Outside Pipe Diameter (inches)	PVC Flexible Pressure Pipe				PVC Rigid Pipe		Corrugated Drainage Tile
		SDR32.5	SDR26	SDR21	SDR17	Sch.40	Sch.80	
1	1.315		1.195	1.189	1.161	1.049	.957	
1 ¼	1.660	1.54	1.532	1.502	1.464	1.380	1.278	
1 ½	1.90	1.78	1.754	1.72	1.676	1.610	1.50	
2	2.375	2.229	2.193	2.149	2.095	2.067	1.939	
2 ½	2.875	2.699	2.655	2.601	2.537	2.469	2.323	
3	3.50	3.284	3.23	3.166	3.088	3.068	2.90	
3 ½	4.0	3.754	3.692	3.62	3.53	3.548	3.364	
4	4.50	4.224	4.154	4.072	3.97	4.026	3.826	4.00
5	5.563	5.221	5.135	5.033	4.909	5.047	4.813	5.00
6	6.625	6.217	6.115	5.993	5.845	6.065	5.761	6.00
8	8.625	8.095	7.961	7.805	7.609	7.981	7.625	

B. Volume Per 100 Feet (Gallons)

Nominal Pipe Size (inches)	PVC Flexible Pressure Pipe				PVC Rigid		
	SDR32.5	SDR26	SDR21	SDR17	Sch. 40	SCH.80	
1		5.8	5.8	5.5	4.5	3.7	
1 ¼	9.7	9.6	9.2	8.7	7.8	6.7	
1 ½	12.9	12.6	12.1	11.5	10.6	9.2	
2	20.3	19.6	18.8	17.9	17.4	15.3	
2 ½	29.7	28.8	27.6	26.3	24.9	22.0	
3	44.0	42.6	40.9	38.9	38.4	34.3	
3 ½	57.5	55.6	53.5	50.8	51.4	46.2	
4	72.8	70.4	67.7	64.3	66.1	59.7	65.3
5	111	108	103	98.3	104	94.5	102
6	158	153	147	139	150	135	147
8	267	259	249	236	260	237	

NOTES:

“SDR” means standard dimension ratio and is the ratio of outside pipe diameter to wall thickness.

Source: derived from ASTM Standards D-1785, D-2241, D-2729, and F-405

**ALLOWANCE IN EQUIVALENT LENGTH OF PIPE FOR FRICTION LOSS
IN VALVES AND THREADED FITTINGS (ASA A40.8-1955)**

DIAMETER OF CHECK FITTING VALVE	90 DEG.	45 DEG.	90 DEG.	COUPLING	GATE	GLOVE	ANGLE	
	STANDARD ELL	STANDARD ELL	STANDARD TEE	OR STR. RUN OF TEE	VALVE	VALVE	VALVE	
Inches Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet
$\frac{3}{8}$	1	0.6	1.5	0.3	0.2	8	4	3
$\frac{1}{2}$	2	1.2	3	0.6	0.4	15	8	5
$\frac{3}{4}$	2.5	1.5	4	0.8	0.5	20	12	7
1	3	1.8	5	0.9	0.6	25	15	8
1 $\frac{1}{4}$	4	2.4	6	1.2	0.8	35	18	11
1 $\frac{1}{2}$	5	3	7	1.5	1.0	45	22	14
2	7	4	10	2	1.3	55	28	19
2 $\frac{1}{2}$	8	5	12	2.5	1.6	65	34	22
3	10	6	15	3	2	80	40	27
3 $\frac{1}{2}$	12	7	18	3.6	2.4	100	50	32
4	14	8	21	4.0	2.7	125	55	38
5	17	10	25	5	3.3	140	70	46
6	20	12	30	6	4	165	80	54

FLOW RATE AS A FUNCTION OF PRESSURE HEAD AND HOLE DIAMETER IN DRILLED
PVC PIPE

<u>Pressure Head</u> (feet) (PSI)		<u>Drilled Hole Diameter (inches)</u>					
		<u>3/32*</u>	<u>1/8**</u>	<u>5/32</u>	<u>3/16</u>	<u>7/32</u>	<u>1/4</u>
		Flow Rate (gallons per minute)					
1	0.43	0.10	0.18	0.29	0.42	0.56	0.74
2	0.87	0.15	0.26	0.41	0.59	0.80	1.04
3	1.30	0.18	0.32	0.50	0.72	0.98	1.28
4	1.73	0.21	0.37	0.58	0.83	1.13	1.48
5	2.16	0.23	0.41	0.64	0.93	1.26	1.65
6	2.60	0.25	0.45	0.70	1.02	1.38	1.81

* This size is not recommended

**Not recommended for entire system, and only for relatively clear effluents

$$Q = 449 CA (2gh)^{1/2}$$

Where: Q = flow per orifice (gpm)
 C = 0.6 for sharp-edged orifices
 A = cross-sectional area of orifice (ft²)
 g = gravitational constant = 32.2 ft/sec²
 h = pressure head (ft)

$$Q = 1697.97 d^2 h^{1/2}$$

Where: Q = flow per orifice (gpm)
 d = diameter of orifice (ft²)
 h = pressure head (ft)

$$Q = 11.79 d^2 h^{1/2}$$

Where: Q = flow per orifice (gpm)
 d = diameter of orifice (inches)
 h = pressure head (ft)

CONVERSION FACTORS

MULTIPLY	BY	TO OBTAIN
Acres	43,560	Square feet
Atmospheres	33.90	Feet of water
Centimeters	0.3937	Inches
Cubic feet	7.48052	Gallons
Cubic feet	28.32	Liters
Cubic feet/sec.	449	Gallons/Min.
Cubic meters	35.31	Cubic feet
Cubic meters	264.2	Gallons
Cubic meters	10^3	Liters
Cubic yards	27	Cubic feet
Cubic yards	202.0	Gallons
Feet	30.48	Centimeters
Feet	0.3048	Meters
Feet of water	62.43	Lbs/sq. ft.
Feet of water	0.434	PSI (lbs./sq. in.)
Gallons	3785	Cubic centimeters
Gallons	0.1337	Cubic feet
Gallons	3.785	Liters
Gallons water	8.3453	Pounds of water
Gallons/min.	2.228×10^{-3}	Cubic feet/sec.
Gallons/min.	1440	Gallons/day
Gallons/min.	0.06308	Liters/sec.

Gallons/day	6.944×10^{-4}	Gallons/min.
Gallons/day/sq.ft.	1.604	Inches/day
Grams	2.205×10^{-3}	Pounds
Grams/liter	1000	Parts/million
Hectares	2.471	Acres
Horsepower	33,000	Foot-Lbs/min.
Horsepower	0.7457	Kilowatts
Inches	2.540	Centimeters
Inches/day	0.6234	Gallons/day/sq.ft.
Kilograms	2.205	Lbs.
Kilowatts	1.341	Horsepower
Kilowatt-hours	2.655×10^6	Foot-lbs.
Liters	10^3	Cubic centimeters
Liters	0.03531	Cubic feet
Liters	0.2642	Gallons
Meters	3.281	Feet
Milligrams/liter	1	Parts/million
Million gals./day	1.54723	Cubic ft/sec.
Parts/million	8.345	Lbs/million gal.
Pounds	453.5024	Grams
Pounds of water	0.1198	Gallons
psi (lbs/sq.in.)	2.31	Feet of water
Square feet	2.296×10^{-5}	Acres
Temp. ($^{\circ}\text{C}$) + 17.78	1.8	Temp. ($^{\circ}\text{F}$)
Temp. ($^{\circ}\text{F}$) - 32	5/9	Temp. ($^{\circ}\text{C}$)