



## INFORMATION BULLETIN / PUBLIC - PLUMBING CODE

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### DOMESTIC WATER PIPE SIZING

This Information Bulletin provides additional information to designers of plumbing systems for sizing domestic water piping systems of all types of construction in accordance with the method identified in Appendix A of the Los Angeles Plumbing Code. This bulletin includes the following:

1. The telephone numbers from the Department of Water and Power needed to obtain the minimum and maximum daily service pressure in areas within the City of Los Angeles. (See pages 2 and 3).
2. The capacities and pressure losses of domestic water meters that are supplied by the Los Angeles Department of Water and Power. (See pages 4 through 6).
3. A conversion table of the water demand load in fixture units to gallons per minute tabulated based on Chart A 2.1, of Appendix A of the Los Angeles Plumbing Code. (See pages 7 through 9).
4. Fixture unit allowance table based on allowable friction loss and pipe diameter for type L copper pipe tabulated based on Charts A 2.1 and A 4.1, of Appendix A of the Los Angeles Plumbing Code. (See pages 10 through 17).
5. Sizing forms to aid in designing simple domestic water systems. (See pages 18 through 20).

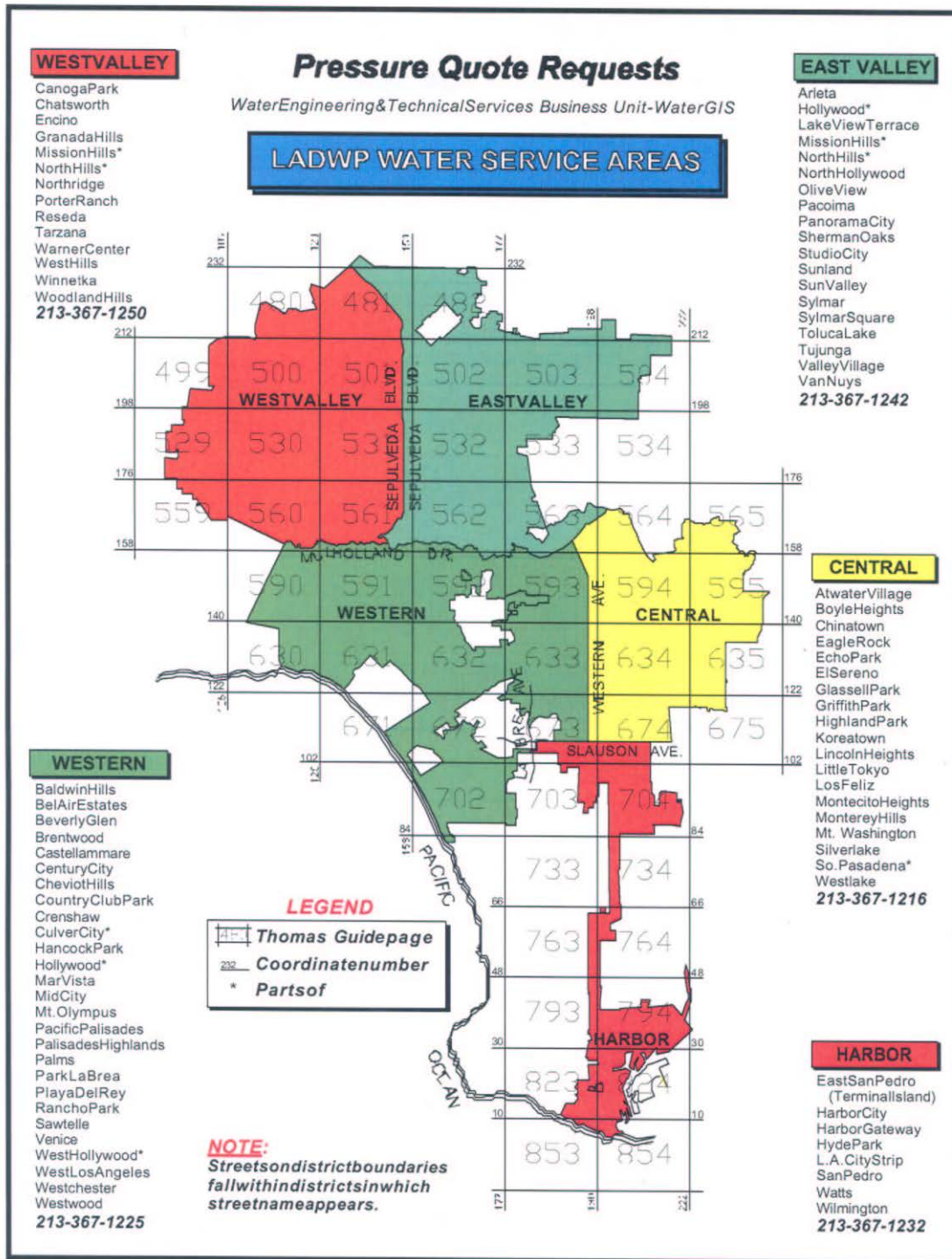
The attached sizing tables provide designers with information consistent with that used by Mechanical Plan Check Engineers during their plan review process.

**F. Available Pressure**

Information regarding the minimum and maximum daily service pressure is obtained by calling the Los Angeles Department of Water and Power at the following numbers depending on where the service is located. See also the map on the next page for additional reference.

<b>WEST VALLEY (213) 367-1250</b>		<b>EAST VALLEY (213) 367-1242</b>	
West of Sepulveda Blvd. North of Mulholland Dr.		East of Sepulveda Blvd. North of Mulholland Dr.	
Canoga Park Chatsworth Encino Granada Hills Mission Hills North Hills Northridge Porter Ranch Reseda	Tarzana Warner Center West Hills Winnetka Woodland Hills	Arleta Hollywood Lake View Terrace Mission Hills North Hills Olive View Pacoima Panorama City Sherman Oaks	Studio City Sunland Sun Valley Sylmar Sylmar Square Toluca Lake Tujunga Valley Village Van Nuys
<b>WESTERN (213) 367-1225</b>		<b>CENTRAL (213) 367-1216</b>	
West of Western Ave. South of Mulholland Dr.		East of Western Ave. South of Mulholland Dr.	
Baldwin Hills Bel Air Estates Beverly Glen Brentwood Castellammare Century City Cheviot Hills Country Club Park Crenshaw Culver City Hancock Park Hollywood Hyde Park Mar Vista	Mid City Mt. Olympus Pacific Palisades Palisades Highlands Palms Park La Brea Playa Del Rey Rancho Park Sawtelle Venice West Hollywood West Los Angeles Westchester Westwood	Atwater Village Boyle Heights Chinatown Eagle Rock Echo Park El Sereno Glassel Park Griffith Park Highland Park Koreatown Lincoln Heights Little Tokyo Los Feliz Montecito Heights	Monterey Hills Mt. Washington Silverlake So. Pasadena Westlake
<b>HARBOR (213) 367-1232</b>			
South of Slauson Ave			
East San Pedro (Terminal Island)	Harbor City Harbor Gateway	LA City Strip San Pedro	South Los Angeles Wilmington

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**NOTE:**  
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A. Information regarding friction loss relative to the rate of flow for meters in the range allowed to be used.

Domestic Water Meter Capacities and Pressure Losses						
	Pressure Loss in p.s.i.					
Meter Size inches	1"	1 ½ "	2"	3" equivalent	4"	6"
Flow g.p.m.						
30	3.0	0.9	0.3			
35	4.2	1.3	0.4	0.2	3.9	2.4
40	5.5	1.7	0.6	0.3	3.8	2.5
45	7.0	2.3	0.8	0.3	3.7	2.6
50	8.8	2.8	1.0	0.4	3.6	2.7
56	11.2	3.6	1.2	0.5	3.6	2.8
60	Use larger meter	4.2	1.4	0.6	3.5	2.9
65		5.0	1.7	0.7	3.4	3
70		6.0	2.0	0.8	3.3	3.1
75		6.8	2.3	0.9	3.3	3.2
80		8.0	2.6	1.0	3.2	3.2
85		9.0	3.0	1.2	3.2	3.3
90		10.0	3.4	1.3	3.1	3.4
96		11.5	3.8	1.4	3.0	3.4
100		12.7	4.2	1.4	3.0	3.5
110		Use larger meter	5.3	1.7	3.0	3.6
120			6.4	2.0	3.0	3.6
130			7.6	2.3	3.0	3.7

Domestic Water Meter Capacities and Pressure Losses						
	Pressure Loss in p.s.i.					
Meter Size inches	1"	1 ½ "	2"	3" equivalent	4"	6"
Flow g.p.m.						
140			8.9	2.6	3.1	3.7
150			10.2	3.0	3.1	3.7
160			11.7	3.3	3.1	3.7
170			Use larger meter	3.6	3.2	3.8
180				3.8	3.2	3.8
190				4.3	3.3	3.8
200				4.8	3.3	3.8
210				5.4	3.6	3.8
220				6.0	3.8	3.7
230				Use larger meter	4.1	3.7
240					4.4	3.7
250					4.6	3.6
260					4.9	3.6
270					5.2	3.5
280					5.4	3.5
290					5.7	3.4
300					6.0	3.4
310					6.6	3.2
320					7.2	3.1
330					7.8	3.0
340					7.8	3.1
360					7.8	3.0

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Domestic Water Meter Capacities and Pressure Losses						
	Pressure Loss in p.s.i.					
Meter Size inches	1"	1 ½ "	2"	3" equivalent	4"	6"
Flow g.p.m.						
380					8.5	2.9
400					9.1	2.8
420					Use larger meter	2.7
440						2.8
460						2.9
480						3.2
500						3.5
550						4.3
600						4.9
650						5.8
700						6.7
Over 700						Use larger meter
Meter Size inches	8"	10"		Meter Size inches	8"	10"
Flow g.p.m.				Flow g.p.m.		
300	2.7	2.2		1500	4.0	3.0
600	3.2	2.5		2000	Use larger meter	3.3
900	3.5	2.8		2500		3.6
1200	3.7	2.9		Over 2500		Use larger meter

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## A. Demand Load

Fixture Units versus g.p.m. Conversion Table								
Flow	Fixture Units		Flow	Fixture Units		Flow	Fixture Units	
g.p.m.	Flush Tank	Flush Valve	g.p.m.	Flush Tank	Flush Valve	g.p.m.	Flush Tank	Flush Valve
1	0	-	22	34	5	43	99	33
2	1	-	23	36	6	44	103	35
3	3	-	24	39	7	45	107	37
4	4	-	25	42	8	46	111	39
5	6	-	26	44	9	47	115	42
6	7	-	27	46	10	48	119	44
7	8	-	28	49	11	49	123	46
8	10	-	29	51	12	50	127	48
9	12	-	30	54	13	51	130	50
10	13	-	31	56	14	52	135	52
11	15	-	32	58	15	53	141	54
12	16	-	33	60	16	54	146	57
13	18	-	34	63	18	55	151	60
14	20	-	35	66	20	56	155	63
15	21	-	36	69	21	57	160	66
16	23	-	37	74	23	58	165	69
17	24	-	38	78	25	59	170	73
18	26	-	39	83	26	60	175	76
19	28	-	40	86	28	62	185	82
20	30	-	41	90	30	64	195	88
21	32	-	42	95	31	66	205	95

Fixture Units versus g.p.m. Conversion Table								
Flow	Fixture Units		Flow	Fixture Units		Flow	Fixture Units	
g.p.m.	Flush Tank	Flush Valve	g.p.m.	Flush Tank	Flush Valve	g.p.m.	Flush Tank	Flush Valve
68	215	102	135	559	460	300	1755	1755
70	225	108	140	585	490	310	1845	1845
72	236	116	145	611	521	320	1926	1926
74	245	124	150	638	559	330	2018	2018
76	254	132	155	665	596	340	2110	2110
78	264	140	160	692	631	350	2204	2204
82	284	158	165	719	666	360	2298	2298
84	294	168	170	748	700	370	2388	2388
86	305	176	175	778	739	380	2480	2480
88	315	186	180	809	775	390	2575	2575
90	326	195	185	840	811	400	2670	2670
92	337	205	190	874	850	410	2765	2765
94	348	214	200	945	931	420	2862	2862
96	359	223	210	1018	1009	430	2960	2960
98	370	234	220	1091	1091	440	3060	3060
100	380	245	230	1173	1173	450	3150	3150
105	406	270	240	1254	1254	500	3620	3620
110	431	295	250	1335	1335	550	4070	4070
115	455	329	260	1418	1418	600	4480	4480
120	479	365	270	1500	1500	700	5380	5380
125	506	396	280	1583	1583	800	6280	6280
130	533	430	290	1668	1668	900	7280	7280



Fixture Units versus g.p.m. Conversion Table								
Flow	Fixture Units		Flow	Fixture Units		Flow	Fixture Units	
g.p.m.	Flush Tank	Flush Valve	g.p.m.	Flush Tank	Flush Valve	g.p.m.	Flush Tank	Flush Valve
1000	8300	8300	1600	14420	14420	2200	20540	20540
1100	9320	9320	1700	15440	15440	2300	21560	21560
1200	10340	10340	1800	16460	16460	2400	22580	22580
1300	11360	11360	1900	17480	17480	2500	23600	23600
1400	12380	12380	2000	18500	18500	2600	24620	24620
1500	13400	13400	2100	19520	19520	2700	25640	25640

**A. Permissible Friction Loss**

1. Section 94.608.1 of the Los Angeles Plumbing Code requires a residual pressure of at least 15 psi. Whenever fixtures and/or fixture fittings are installed which require residual pressure higher than 15 psi, that minimum pressure shall be provided.
2. Sections 94.610.12.1 and 94.610.12.2 limit the maximum velocities in copper and copper alloy tube and fitting systems to a maximum of 8 ft/s in cold water and 5 ft/s in hot water. The following table reports the fixture unit loading in type L copper (the most common) for various allowable friction losses and water velocities not to exceed the maximum allowed. For pressure losses of 25 psi per 100 feet of pipe and higher, the system is limited by the maximum velocity, and at this point a higher allowable loss will make no difference in the sizing of the water system.

**WATER PIPE SIZING**  
**FIXTURE UNITS versus FRICTION LOSS (PSI/100 ft)**  
**TYPE L COPPER**

Friction Loss psi 100 ft	Nominal Pipe Diameter (inches) Internal Pipe Diameter (inches)	0.5	0.75	1	1.25	1.5	2	2.5	3	3.5	4
		0.545	0.785	1.025	1.265	1.505	1.985	2.465	2.945	3.425	3.905
1	Cold Water - Flush Valve	0	0	0	0	0	14	60	186	430	811
	Cold Water - Flush Tank	0	2	6	12	21	56	151	315	533	840
	Hot Water (5 ft/s max)	0	2	6	12	21	56	151	315	533	840
1.1	Cold Water - Flush Valve	0	0	0	0	0	15	69	205	460	850
	Cold Water - Flush Tank	0	2	6	13	21	58	165	337	559	874
	Hot Water (5 ft/s max)	0	2	6	13	21	58	165	337	559	840
1.2	Cold Water - Flush Valve	0	0	0	0	0	18	76	223	490	931
	Cold Water - Flush Tank	0	2	7	13	23	63	175	359	585	945
	Hot Water (5 ft/s max)	0	2	7	13	23	63	175	359	585	840
1.3	Cold Water - Flush Valve	0	0	0	0	0	21	82	245	559	1009
	Cold Water - Flush Tank	0	3	7	13	24	69	185	380	638	1018
	Hot Water (5 ft/s max)	0	3	7	13	24	69	185	380	585	840
1.4	Cold Water - Flush Valve	0	0	0	0	0	23	95	270	596	1091
	Cold Water - Flush Tank	0	3	7	15	26	74	205	406	665	1091
	Hot Water (5 ft/s max)	0	3	7	15	26	74	205	406	585	840
1.5	Cold Water - Flush Valve	0	0	0	0	0	25	102	270	631	1173
	Cold Water - Flush Tank	0	3	7	15	26	78	215	406	692	1173
	Hot Water (5 ft/s max)	0	3	7	15	26	78	215	406	585	840
1.6	Cold Water - Flush Valve	0	0	0	0	0	28	108	295	666	1173
	Cold Water - Flush Tank	0	3	8	16	28	86	225	431	719	1173
	Hot Water (5 ft/s max)	0	3	8	16	28	86	225	406	585	840
1.7	Cold Water - Flush Valve	0	0	0	0	0	30	116	329	700	1254
	Cold Water - Flush Tank	0	3	8	16	30	90	236	455	748	1254
	Hot Water (5 ft/s max)	0	3	8	16	30	90	236	406	585	840
1.8	Cold Water - Flush Valve	0	0	0	0	0	31	124	365	775	1335
	Cold Water - Flush Tank	0	3	8	18	30	95	245	479	809	1335
	Hot Water (5 ft/s max)	0	3	8	18	30	95	245	406	585	840
1.9	Cold Water - Flush Valve	0	0	0	0	0	35	140	365	811	1418
	Cold Water - Flush Tank	0	3	8	18	32	103	264	479	840	1418
	Hot Water (5 ft/s max)	0	3	8	18	32	103	245	406	585	840
2	Cold Water - Flush Valve	0	0	0	0	0	37	148	396	850	1418
	Cold Water - Flush Tank	0	3	8	18	32	107	275	506	874	1418
	Hot Water (5 ft/s max)	0	3	8	18	32	107	245	406	585	840
2.2	Cold Water - Flush Valve	0	0	0	0	6	42	168	460	931	1583
	Cold Water - Flush Tank	0	4	10	20	36	115	294	559	945	1583
	Hot Water (5 ft/s max)	0	4	10	20	36	115	245	406	585	840

**WATER PIPE SIZING  
FIXTURE UNITS versus FRICTION LOSS (PSI/100 ft)**

**TYPE L COPPER**

Friction Loss psi 100 ft	Nominal Pipe Diameter (inches) Internal Pipe Diameter (inches)	0.5	0.75	1	1.25	1.5	2	2.5	3	3.5	4
		0.545	0.785	1.025	1.265	1.505	1.985	2.465	2.945	3.425	3.905
2.4	Cold Water - Flush Valve	0	0	0	0	7	48	186	490	1009	1668
	Cold Water - Flush Tank	0	4	10	21	39	127	315	585	1018	1668
	Hot Water (5 ft/s max)	0	4	10	21	39	119	245	406	585	840
2.6	Cold Water - Flush Valve	0	0	0	0	8	52	205	521	1091	1668
	Cold Water - Flush Tank	0	4	12	21	42	135	337	611	1091	1668
	Hot Water (5 ft/s max)	0	4	12	21	42	119	245	406	585	840
2.8	Hot Water (5 ft/s max)	0	0	0	0	9	57	223	559	1091	1668
	Cold Water - Flush Tank	0	4	12	23	44	146	359	638	1091	1668
	Hot Water (5 ft/s max)	0	4	12	23	44	119	245	406	585	840
3	Cold Water - Flush Valve	0	0	0	0	10	63	245	596	1091	1668
	Cold Water - Flush Tank	0	4	12	24	46	155	380	665	1091	1668
	Hot Water (5 ft/s max)	0	4	12	24	46	119	245	406	585	840
3.2	Cold Water - Flush Valve	0	0	0	0	11	69	245	666	1091	1668
	Cold Water - Flush Tank	0	6	13	24	49	165	380	719	1091	1668
	Hot Water (5 ft/s max)	0	6	13	24	46	119	245	406	585	840
3.4	Cold Water - Flush Valve	0	0	0	0	12	76	270	666	1091	1668
	Cold Water - Flush Tank	1	6	13	26	51	175	406	719	1091	1668
	Hot Water (5 ft/s max)	1	6	13	26	46	119	245	406	585	840
3.6	Cold Water - Flush Valve	0	0	0	0	13	82	295	666	1091	1668
	Cold Water - Flush Tank	1	6	13	28	54	185	431	719	1091	1668
	Hot Water (5 ft/s max)	1	6	13	28	46	119	245	406	585	840
3.8	Cold Water - Flush Valve	0	0	0	0	14	88	295	666	1091	1668
	Cold Water - Flush Tank	1	6	15	28	56	195	431	719	1091	1668
	Hot Water (5 ft/s max)	1	6	15	28	46	119	245	406	585	840
4	Cold Water - Flush Valve	0	0	0	0	14	95	329	666	1091	1668
	Cold Water - Flush Tank	1	6	15	30	56	205	455	719	1091	1668
	Hot Water (5 ft/s max)	1	6	15	28	46	119	245	406	585	840
4.2	Cold Water - Flush Valve	0	0	0	0	15	95	329	666	1091	1668
	Cold Water - Flush Tank	1	6	15	30	58	205	455	719	1091	1668
	Hot Water (5 ft/s max)	1	6	15	28	46	119	245	406	585	840
4.4	Cold Water - Flush Valve	0	0	0	0	16	102	329	666	1091	1668
	Cold Water - Flush Tank	1	7	16	32	60	215	455	719	1091	1668
	Hot Water (5 ft/s max)	1	7	16	28	46	119	245	406	585	840
4.6	Cold Water - Flush Valve	0	0	0	0	18	108	329	666	1091	1668
	Cold Water - Flush Tank	1	7	16	32	63	225	455	719	1091	1668
	Hot Water (5 ft/s max)	1	7	16	28	46	119	245	406	585	840

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**WATER PIPE SIZING**  
**FIXTURE UNITS versus FRICTION LOSS (PSI/100 ft)**  
**TYPE L COPPER**

Friction Loss psi 100 ft	Nominal Pipe Diameter (inches) Internal Pipe Diameter (inches)	0.5	0.75	1	1.25	1.5	2	2.5	3	3.5	4
		0.545	0.785	1.025	1.265	1.505	1.985	2.465	2.945	3.425	3.905
4.8	Cold Water - Flush Valve	0	0	0	5	20	116	329	666	1091	1668
	Cold Water - Flush Tank	1	7	16	34	66	236	455	719	1091	1668
	Hot Water (5 ft/s max)	1	7	16	28	46	119	245	406	585	840
5	Cold Water - Flush Valve	0	0	0	5	20	124	329	666	1091	1668
	Cold Water - Flush Tank	1	7	18	34	66	245	455	719	1091	1668
	Hot Water (5 ft/s max)	1	7	16	28	46	119	245	406	585	840
5.2	Cold Water - Flush Valve	0	0	0	6	21	132	329	666	1091	1668
	Cold Water - Flush Tank	2	7	18	36	69	254	455	719	1091	1668
	Hot Water (5 ft/s max)	2	7	16	28	46	119	245	406	585	840
5.4	Cold Water - Flush Valve	0	0	0	6	23	132	329	666	1091	1668
	Cold Water - Flush Tank	2	7	18	36	74	254	455	719	1091	1668
	Hot Water (5 ft/s max)	2	7	16	28	46	119	245	406	585	840
5.6	Cold Water - Flush Valve	0	0	0	7	25	132	329	666	1091	1668
	Cold Water - Flush Tank	2	7	18	39	78	254	455	719	1091	1668
	Hot Water (5 ft/s max)	2	7	16	28	46	119	245	406	585	840
5.8	Hot Water (5 ft/s max)	0	0	0	7	25	132	329	666	1091	1668
	Cold Water - Flush Tank	2	8	20	39	78	254	455	719	1091	1668
	Hot Water (5 ft/s max)	2	8	16	28	46	119	245	406	585	840
6	Cold Water - Flush Valve	0	0	0	8	26	132	329	666	1091	1668
	Cold Water - Flush Tank	2	8	20	42	83	254	455	719	1091	1668
	Hot Water (5 ft/s max)	2	8	16	28	46	119	245	406	585	840
6.2	Cold Water - Flush Valve	0	0	0	8	28	132	329	666	1091	1668
	Cold Water - Flush Tank	2	8	20	42	86	254	455	719	1091	1668
	Hot Water (5 ft/s max)	2	8	16	28	46	119	245	406	585	840
6.4	Cold Water - Flush Valve	0	0	0	9	30	132	329	666	1091	1668
	Cold Water - Flush Tank	2	8	20	44	90	254	455	719	1091	1668
	Hot Water (5 ft/s max)	2	8	16	28	46	119	245	406	585	840
6.6	Cold Water - Flush Valve	0	0	0	9	30	132	329	666	1091	1668
	Cold Water - Flush Tank	2	8	21	44	90	254	455	719	1091	1668
	Hot Water (5 ft/s max)	2	8	16	28	46	119	245	406	585	840
6.8	Cold Water - Flush Valve	0	0	0	9	31	132	329	666	1091	1668
	Cold Water - Flush Tank	2	8	21	44	95	254	455	719	1091	1668
	Hot Water (5 ft/s max)	2	8	16	28	46	119	245	406	585	840

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FIXTURE UNITS versus FRICTION LOSS (PSI/100 ft)  
TYPE L COPPER**

Friction Loss psi 100 ft	Nominal Pipe Diameter (inches) Internal Pipe Diameter (inches)	0.5	0.75	1	1.25	1.5	2	2.5	3	3.5	4
		0.545	0.785	1.025	1.265	1.505	1.985	2.465	2.945	3.425	3.905
7	Cold Water - Flush Valve	0	0	0	10	33	132	329	666	1091	1668
	Cold Water - Flush Tank	2	8	21	46	99	254	455	719	1091	1668
	Hot Water (5 ft/s max)	2	8	16	28	46	119	245	406	585	840
7.2	Cold Water - Flush Valve	0	0	0	10	33	132	329	666	1091	1668
	Cold Water - Flush Tank	3	8	21	46	99	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
7.4	Cold Water - Flush Valve	0	0	0	11	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	10	23	49	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
7.6	Cold Water - Flush Valve	0	0	0	11	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	10	23	49	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
7.8	Cold Water - Flush Valve	0	0	0	11	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	10	23	49	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
8	Cold Water - Flush Valve	0	0	0	12	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	10	23	51	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
8.2	Cold Water - Flush Valve	0	0	0	12	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	10	24	51	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
8.4	Cold Water - Flush Valve	0	0	0	13	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	10	24	54	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
8.6	Cold Water - Flush Valve	0	0	0	13	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	10	24	54	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
8.8	Hot Water (5 ft/s max)	0	0	0	13	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	10	24	54	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
9	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	10	24	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840

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**WATER PIPE SIZING**  
**FIXTURE UNITS versus FRICTION LOSS (PSI/100 ft)**  
**TYPE L COPPER**

Friction Loss <u>psi</u> 100 ft	Nominal Pipe Diameter (inches) Internal Pipe Diameter (inches)	0.5	0.75	1	1.25	1.5	2	2.5	3	3.5	4
		0.545	0.785	1.025	1.265	1.505	1.985	2.465	2.945	3.425	3.905
9.2	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	12	26	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
9.4	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	12	26	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
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	Cold Water - Flush Tank	3	12	26	56	103	254	455	719	1091	1668
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	Cold Water - Flush Tank	3	12	26	56	103	254	455	719	1091	1668
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10	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	12	28	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
10.2	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	12	28	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
10.4	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	12	28	56	103	254	455	719	1091	1668
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10.6	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	12	28	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
10.8	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	12	28	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
11	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	12	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
11.2	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	3	13	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840

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**WATER PIPE SIZING  
FIXTURE UNITS versus FRICTION LOSS (PSI/100 ft)  
TYPE L COPPER**

Friction Loss psi 100 ft	Nominal Pipe Diameter (inches) Internal Pipe Diameter (inches)	0.5	0.75	1	1.25	1.5	2	2.5	3	3.5	4
		0.545	0.785	1.025	1.265	1.505	1.985	2.465	2.945	3.425	3.905
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	Cold Water - Flush Tank	3	13	30	56	103	254	455	719	1091	1668
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	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
12.2	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	4	13	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
12.4	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
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	Cold Water - Flush Tank	4	13	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
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	Cold Water - Flush Tank	4	13	30	56	103	254	455	719	1091	1668
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**FIXTURE UNITS versus FRICTION LOSS (PSI/100 ft)**  
**TYPE L COPPER**

Friction Loss psi 100 ft	Nominal Pipe Diameter (inches) Internal Pipe Diameter (inches)	0.5	0.75	1	1.25	1.5	2	2.5	3	3.5	4
		0.545	0.785	1.025	1.265	1.505	1.985	2.465	2.945	3.425	3.905
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	Cold Water - Flush Tank	4	15	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
13.8	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	4	15	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
14	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	4	15	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
14.2	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	4	15	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
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	Cold Water - Flush Tank	4	15	30	56	103	254	455	719	1091	1668
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	Cold Water - Flush Tank	4	15	30	56	103	254	455	719	1091	1668
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14.8	Hot Water (5 ft/s max)	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	4	15	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
15	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	4	15	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
15.5	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	4	15	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
16	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	4	16	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
16.5	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
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**FIXTURE UNITS versus FRICTION LOSS (PSI/100 ft)**  
**TYPE L COPPER**

Friction Loss psi 100 ft	Nominal Pipe Diameter (inches) Internal Pipe Diameter (inches)	0.5	0.75	1	1.25	1.5	2	2.5	3	3.5	4
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	Cold Water - Flush Tank	4	16	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
17.5	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	4	16	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
18	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	4	16	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
19	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	6	16	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
20	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	6	16	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
21	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	6	16	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
22	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	6	16	30	56	103	254	455	719	1091	1668
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	Cold Water - Flush Tank	6	16	30	56	103	254	455	719	1091	1668
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24	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	6	16	30	56	103	254	455	719	1091	1668
	Hot Water (5 ft/s max)	3	8	16	28	46	119	245	406	585	840
25	Cold Water - Flush Valve	0	0	0	14	35	132	329	666	1091	1668
	Cold Water - Flush Tank	6	16	30	56	103	254	455	719	1091	1668
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**A. Simple Sizing Forms**

The following forms are provided for sizing simple domestic water systems. These forms do not cover complex water system design features such as a substantial distance or change in elevation between the pressure reducing valve and the building, nor do they allow for designing by branches, node points, down-feed systems, or booster pumps. The engineering of complex systems requires all the expertise of an experienced designer and goes beyond the scope of these forms.

**SIMPLE SIZING FORM FOR DOMESTIC WATER SYSTEMS**

This is a very simplified form and should not be used for complex design as design by branches, systems with booster pumps, down-feed systems, etc.

**JOB ADDRESS**

WATER INFORMATION FROM DWP: MAX PRESS. \_\_\_\_\_ psi MIN PRESS. \_\_\_\_\_ ft  
psi at \_\_\_\_\_ a.s.l.

GIVEN BY \_\_\_\_\_ DATE \_\_\_\_\_

METER SIZE \_\_\_\_\_ in

\_\_\_\_\_ F. U. \_\_\_\_\_ g.p.m. DEVELOPED LENGTH \_\_\_\_\_ ft

25% OF DEVELOPED LENGTH \_\_\_\_\_ ft

EQUIVALENT LENGTH (Developed length + 25%) \_\_\_\_\_ ft

**WATER CLOSETS AND URINALS**

	With Tank	W/Flush Valve	MAKE	MODEL
WC1				
WC2				
WC3				
WC4				
UR1				
UR2				

**SYSTEM COMPONENTS**

PIPING MATERIAL COPPER TYPE K \_\_\_\_\_ L \_\_\_\_\_ M \_\_\_\_\_ GALVANIZED IRON \_\_\_\_\_ OTHER (specify)

PRESSURE REDUCING VALVE SIZE \_\_\_\_\_ MAKE \_\_\_\_\_ MODEL \_\_\_\_\_

BACKFLOW PREVENTION DEVICE SIZE \_\_\_\_\_ MAKE \_\_\_\_\_ MODEL \_\_\_\_\_

**HYDRAULIC CALCULATIONS**

A.	MINIMUM PRESSURE AT CITY MAIN	psi
B.	SET PRESSURE AT PRESSURE REDUCING VALVE	psi
C.	PRESSURE LOSS THROUGH _____ inch METER	psi
D.	PRESSURE LOSS THROUGH _____ inch REDUCED PRESSURE BACKFLOW PREVENTER	psi
E.	PRESSURE LOSS THROUGH _____ inch PRESSURE REDUCING VALVE	psi
F.	PRESSURE LOSS THROUGH SOFTENER OR OTHER MISCELLANEOUS EQUIPMENT	psi
G.	PRESSURE LOSS DUE TO ELEVATION _____ ftX0.43=	psi
H.	RESIDUAL PRESSURE	psi
I.	TOTAL PRESSURE LOSSES	psi
J.	PRESSURE AVAILABLE FOR FRICTION LOSS IN THE SYSTEM	psi
<b>K.</b>	<b>PRESSURE/100ft (J/EQUIVALENT LENGTH X100)</b>	<b>psi/100ft</b>

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FIXTURE UNIT COUNT				PIPE SIZE SCHEDULE			
FIXTURE UNIT TYPE	F. U. Value	Quantity	TOTAL	PIPE MAT.			
Kitchen Sinks	1.5			PRESS. LOSS psi/100ft			
Dishwashers	1.5			ALLOWED F. U.			
Bar Sinks				Flush Tank		Flush Valve	
Mop or Service Sinks				Size (in.)	Hot Water	Cold Water	Cold Water
Clothes Washers	4				(5ft/s)	(8ft/s)	(8ft/s)
Lavatories	1			1/2			0
Bathtub	4			3/4			0
Bathtub 3/4 inch fill	10			1			0
Showers	2			1 1/4			
Water Closets				1 1/2			
Water Closets with Flushometer Valve				2			
Urinals with Flushometer Valve				2 1/2			
First Hose Bibb	2.5			3			
Additional Hose Bibbs	1			3 1/2			
				4			
				5			
				6			
TOTAL FIXTURE UNITS				=			g.p.m.
Additional Flow				=			g.p.m.
TOTAL FLOW				=			g.p.m.

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