



Water Meter Sizing per AWWA M22, Third Edition

Project: Edgepoint 3 - Bldg 1
 Client: _____
 Address: _____
 City: _____ State: _____ Zip Code: _____
 Type of Occupancy: Multi-family apartments - 20 unit

Fixture	Fixture Value 60 psi		No. of Fixtures		Fixture Value
Bathtub	8	x	30	=	240
Bedpan Washers	10	x		=	
Bidet	2	x		=	
Dental Unit	2	x		=	
Drinking Fountain – Public	2	x		=	
Kitchen Sink	1.5	x	20	=	30
Lavatory	.5	x	40	=	20
Showerhead (Shower Only)	1.75	x		=	
Service Sink	4	x		=	
Toilet – Flush Valve	35	x		=	
– Tank Type	4	x	30	=	120
Urinal – Pedestal Flush Valve	35	x		=	
– Wall Flush Valve	16	x		=	
Wash Sink (Each Set of Faucets)	4	x		=	
Dishwasher	2	x	20	=	40
Washing Machine	6	x	20	=	120
Hose (50 ft. Wash Down) – ½ in.	5	x		=	
– ⅝ in.	9	x		=	
– ¾ in.	12	x	2	=	24

Combined Fixture Total 594

Water-flow Demand per Fixture Value from Figure 4-2 or 4-3 x Pressure Adjustment Factor = 51 gpm
**For Residual Pressures at Fixture Outlet from 60-80 psi, Pressure Adjustment Factor is 1.00 per Table 4-3*

Add Irrigation – _____ Sections* x 1.16 or 0.40† = _____ gpm
 – _____ Hose Bibs x Fixture Value x _____ Press. Adj. Factor = _____ gpm
 Added Fixed Load = _____ gpm
 TOTAL FIXED DEMAND = _____ gpm

*100 ft² area = 1 section
 †Spray systems – Use 1.16; Rotary systems – Use 0.40

Meter size chosen per Table 6-1 = 1.5 in.

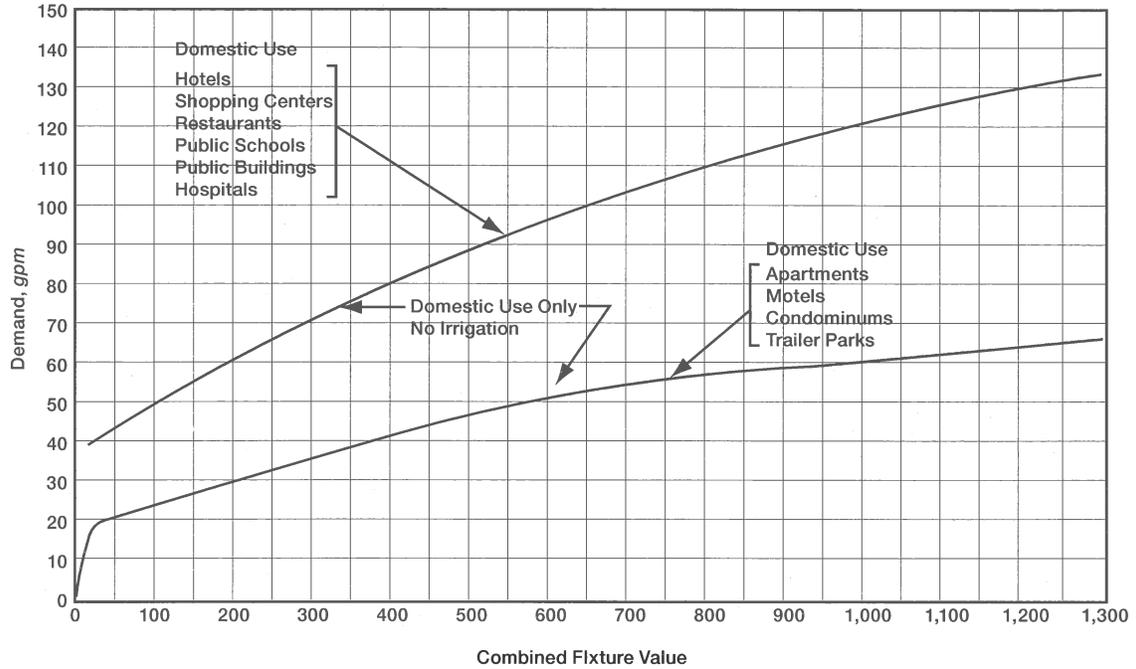


Figure 4-2 Water-flow demand per fixture value—enlarged scale from Figure 4-1

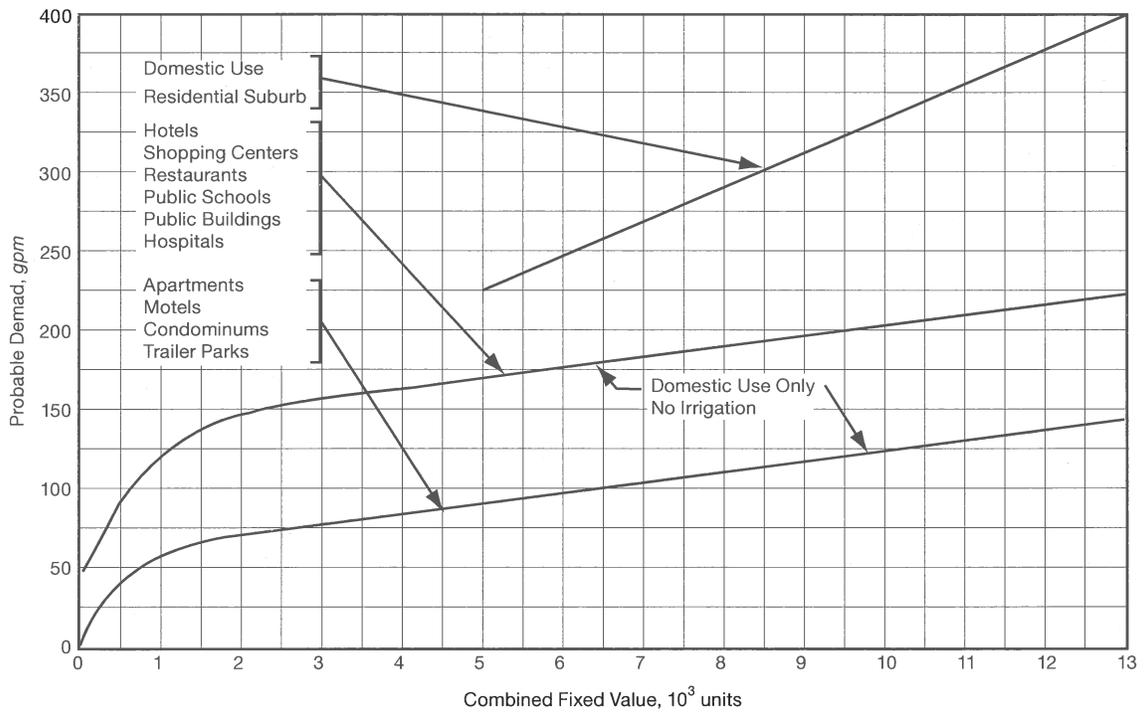


Figure 4-3 Water-flow demand per fixture value

Table 4-3 Example of fixture value adjustment for pressure (based on Figure 4-6)

Kitchen Faucet Fixture Value Adjustment				
Residual Pressure at Fixture Outlet, <i>psi</i>	Baseline Flow Rate at 60 <i>psi</i>	Actual Flow Rate at Residual Pressure (Fixture Value)	Pressure Adjustment Factor	
15	1.8	1.0	0.56	
20	1.8	1.1	0.61	
25	1.8	1.2	0.67	
30	1.8	1.3	0.72	
35	1.8	1.4	0.78	
40	1.8	1.5	0.83	
50	1.8	1.7	0.94	
60	1.8	1.8	1.00	
70	1.8	1.8	1.00	
80	1.8	1.8	1.00	

Table 6-1 AWWA meter standards

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
Positive displacement						
½ in.	0.25	1	N/A	7.5	15	15
⅝ in.	0.25	1		10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Multijet						
⅝ in.	0.25	1	N/A	10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Turbine class II						
1½ in.	N/A	4	N/A	90	120	7
2 in.		4		160	190	7
3 in.		8		350	435	7
4 in.		15		650	750	7
6 in.		30		1,400	1,600	7
8 in.		50		2,400	2,800	7
10 in.		75		3,500	4,200	7
12 in.		120		4,400	5,300	7
16 in.		200		6,500	7,800	7
20 in.		300		10,000	12,000	7
Compound class II						
2 in.	0.25	1	13	80	160	15
3 in.	0.50	2	15	175	350	15
4 in.	0.75	3	18	300	600	15
6 in.	1.50	5	20	675	1,350	15
8 in.	2.00	16	35	900	1,600	15
Fire service, type II—compound						
3 in.	* see note	2	30	250	350	12
4 in.		4	40	400	700	12
6 in.		5	90	900	1,600	12
8 in.		8	150	1,600	2,800	12
10 in.		8	200	2,200	4,400	12

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

*Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

(Table continued on next page.)

Table 6-1 AWWA meter standards (continued)

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
Fire service, type III—turbine						
3 in.	4	5	N/A	250	350	11
4 in.	10	15		400	700	11
6 in.	20	30		900	1,600	11
8 in.	30	35		1,600	2,800	11
10 in.	35	55		2,500	4,400	11
Propeller (main line)						
2 in.	N/A	45	N/A	100	120	5
3 in.		80		250	300	5
4 in.		85		500	600	2
6 in.		160		1,200	1,350	1
8 in.		190		1,500	1,800	0.5
10 in.		260		2,000	2,400	0.5
12 in.		275		2,800	3,375	0.5
14 in.		350		3,750	4,500	0.5
16 in.		450		4,750	5,700	0.5
18 in.		550		5,625	6,750	0.25
20 in.		650		6,875	8,250	0.25
24 in.		1,000		10,000	12,000	0.25
30 in.		1,600		15,000	18,000	0.25
36 in.		2,400		20,000	24,000	0.25
42 in.		2,800		28,000	40,000	0.1
48 in.		3,500		35,000	50,000	0.1
54 in.		5,000		45,000	55,000	0.1
60 in.		6,000		60,000	80,000	0.1
66 in.		7,500		75,000	95,000	0.1
72 in.		9,000		90,000	115,000	0.1
Fluidic oscillator						
½ in.	0.25	1	N/A	7.5	15	15
⅝ in.	0.25	1		10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Singlejet						
⅝ in.	0.25	1	N/A	10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		20	40	15
1½ in.	0.50	1.5	N/A	50	100	15

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

* Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

(Table continued on next page.)

Table 6-1 AWWA meter standards (continued)

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
2 in.	0.50	2.0		80	160	15
3 in.	0.50	2.5		160	320	15
4 in.	0.75	3.0		250	500	15
6 in.	1.50	4.0		500	1,000	15
Residential Fire Sprinkler						
¾ in.	0.5	2	N/A	15	30	10.1
1 in.	0.75	2		25	50	10.7
1½ in.	1.5	3		50	100	7.7
2 in.	2.0	4		80	160	7.7
Residential Fire Sprinkler w/ strainer						
¾ in.	0.5	2	N/A	15	30	14.5
1 in.	0.75	2		25	50	15.3
1½ in.	1.5	3		50	100	11
2 in.	2.0	4		80	160	11

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

* Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

Table 6-2 Typical uses for each type of meter classification

Meter Type	Typical Use
Positive displacement, fluidic oscillator, multijet, singlejet, static, turbine, electromagnetic, or ultrasonic	Single-family residential, apartment buildings with fewer than 100 units; small businesses (e.g., filling stations, restaurants, small hotels, motels, small office buildings, retail stores, etc.); schools and other public buildings without large irrigation demands
Turbine, singlejets, static, electromagnetic or ultrasonic	Large hotels, factories, hospitals, irrigation, large office buildings, pump discharge, laundries, nursing homes
Compound, singlejets, turbine, multijet, static, electromagnetic or ultrasonic	Schools (with irrigation), apartment buildings with more than 100 units, dormitories, assisted living centers, retail shopping centers
Residential fire meters	One- and two-family dwellings and manufactured homes (NFPA 13D applications)
Fire-line meters	Fire service (for various NFPA 13 and NFPA 13R applications)
Differential pressure (venturi, flow tube), electromagnetic or ultrasonic meters	Pump discharge, wholesale water purchasers, research applications, subsystem metering



Water Meter Sizing per AWWA M22, Third Edition

Project: Edgepoint 3 - Bldg 2
 Client: _____
 Address: _____
 City: _____ State: _____ Zip Code: _____
 Type of Occupancy: Multi-family apartments - 45 unit

Fixture	Fixture Value 60 psi		No. of Fixtures		Fixture Value
Bathtub	8	x	63	=	504
Bedpan Washers	10	x		=	
Bidet	2	x		=	
Dental Unit	2	x		=	
Drinking Fountain – Public	2	x		=	
Kitchen Sink	1.5	x	45	=	67.5
Lavatory	.5	x	81	=	40
Showerhead (Shower Only)	1.75	x		=	
Service Sink	4	x		=	
Toilet – Flush Valve	35	x		=	
– Tank Type	4	x	63	=	252
Urinal – Pedestal Flush Valve	35	x		=	
– Wall Flush Valve	16	x		=	
Wash Sink (Each Set of Faucets)	4	x		=	
Dishwasher	2	x	45	=	90
Washing Machine	6	x	45	=	270
Hose (50 ft. Wash Down) – ½ in.	5	x		=	
– ⅝ in.	9	x		=	
– ¾ in.	12	x	2	=	24

Combined Fixture Total 1248

Water-flow Demand per Fixture Value from Figure 4-2 or 4-3 x Pressure Adjustment Factor = 65 gpm
**For Residual Pressures at Fixture Outlet from 60-80 psi, Pressure Adjustment Factor is 1.00 per Table 4-3*

Add Irrigation – _____ Sections* x 1.16 or 0.40† = _____ gpm
 – _____ Hose Bibs x Fixture Value x _____ Press. Adj. Factor = _____ gpm
 Added Fixed Load = _____ gpm
 TOTAL FIXED DEMAND = _____ gpm

*100 ft² area = 1 section
 †Spray systems – Use 1.16; Rotary systems – Use 0.40

Meter size chosen per Table 6-1 = 1.5 in.

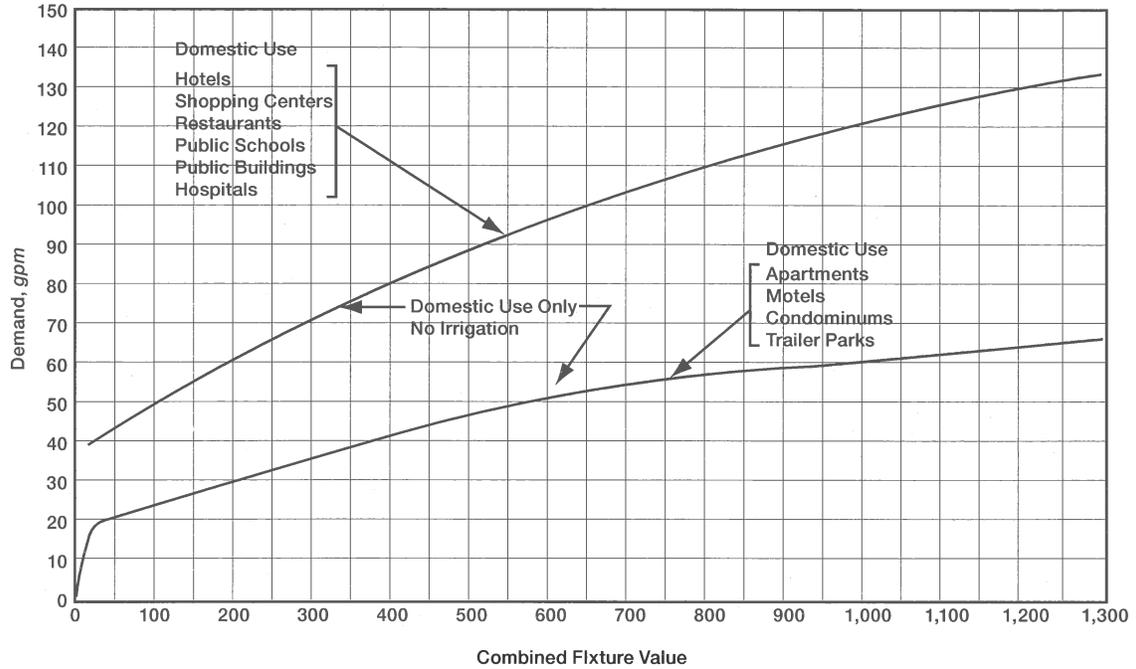


Figure 4-2 Water-flow demand per fixture value—enlarged scale from Figure 4-1

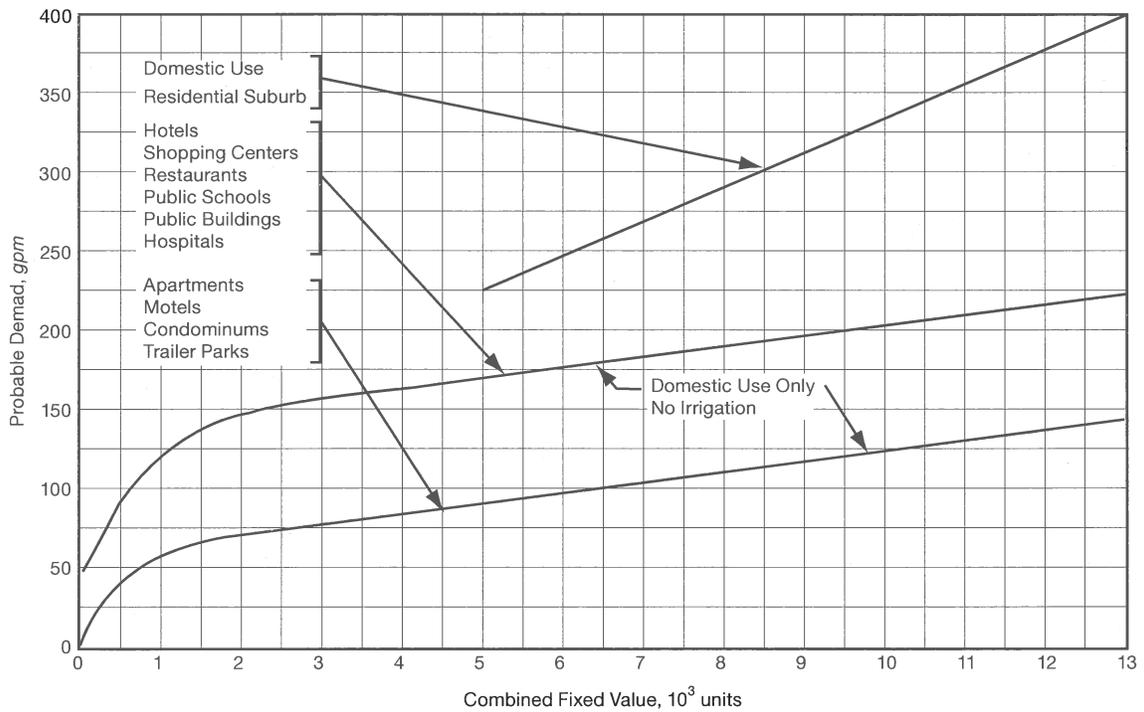


Figure 4-3 Water-flow demand per fixture value

Table 4-3 Example of fixture value adjustment for pressure (based on Figure 4-6)

Kitchen Faucet Fixture Value Adjustment				
Residual Pressure at Fixture Outlet, <i>psi</i>	Baseline Flow Rate at 60 <i>psi</i>	Actual Flow Rate at Residual Pressure (Fixture Value)	Pressure Adjustment Factor	
15	1.8	1.0	0.56	
20	1.8	1.1	0.61	
25	1.8	1.2	0.67	
30	1.8	1.3	0.72	
35	1.8	1.4	0.78	
40	1.8	1.5	0.83	
50	1.8	1.7	0.94	
60	1.8	1.8	1.00	
70	1.8	1.8	1.00	
80	1.8	1.8	1.00	

Table 6-1 AWWA meter standards

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
Positive displacement						
½ in.	0.25	1	N/A	7.5	15	15
⅝ in.	0.25	1		10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Multijet						
⅝ in.	0.25	1	N/A	10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Turbine class II						
1½ in.	N/A	4	N/A	90	120	7
2 in.		4		160	190	7
3 in.		8		350	435	7
4 in.		15		650	750	7
6 in.		30		1,400	1,600	7
8 in.		50		2,400	2,800	7
10 in.		75		3,500	4,200	7
12 in.		120		4,400	5,300	7
16 in.		200		6,500	7,800	7
20 in.		300		10,000	12,000	7
Compound class II						
2 in.	0.25	1	13	80	160	15
3 in.	0.50	2	15	175	350	15
4 in.	0.75	3	18	300	600	15
6 in.	1.50	5	20	675	1,350	15
8 in.	2.00	16	35	900	1,600	15
Fire service, type II—compound						
3 in.	* see note	2	30	250	350	12
4 in.		4	40	400	700	12
6 in.		5	90	900	1,600	12
8 in.		8	150	1,600	2,800	12
10 in.		8	200	2,200	4,400	12

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

*Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

(Table continued on next page.)

Table 6-1 AWWA meter standards (continued)

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
Fire service, type III—turbine						
3 in.	4	5	N/A	250	350	11
4 in.	10	15		400	700	11
6 in.	20	30		900	1,600	11
8 in.	30	35		1,600	2,800	11
10 in.	35	55		2,500	4,400	11
Propeller (main line)						
2 in.	N/A	45	N/A	100	120	5
3 in.		80		250	300	5
4 in.		85		500	600	2
6 in.		160		1,200	1,350	1
8 in.		190		1,500	1,800	0.5
10 in.		260		2,000	2,400	0.5
12 in.		275		2,800	3,375	0.5
14 in.		350		3,750	4,500	0.5
16 in.		450		4,750	5,700	0.5
18 in.		550		5,625	6,750	0.25
20 in.		650		6,875	8,250	0.25
24 in.		1,000		10,000	12,000	0.25
30 in.		1,600		15,000	18,000	0.25
36 in.		2,400		20,000	24,000	0.25
42 in.		2,800		28,000	40,000	0.1
48 in.		3,500		35,000	50,000	0.1
54 in.		5,000		45,000	55,000	0.1
60 in.		6,000		60,000	80,000	0.1
66 in.		7,500		75,000	95,000	0.1
72 in.		9,000		90,000	115,000	0.1
Fluidic oscillator						
½ in.	0.25	1	N/A	7.5	15	15
⅝ in.	0.25	1		10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Singlejet						
⅝ in.	0.25	1	N/A	10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		20	40	15
1½ in.	0.50	1.5	N/A	50	100	15

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

* Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

(Table continued on next page.)

Table 6-1 AWWA meter standards (continued)

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
2 in.	0.50	2.0		80	160	15
3 in.	0.50	2.5		160	320	15
4 in.	0.75	3.0		250	500	15
6 in.	1.50	4.0		500	1,000	15
Residential Fire Sprinkler						
¾ in.	0.5	2	N/A	15	30	10.1
1 in.	0.75	2		25	50	10.7
1½ in.	1.5	3		50	100	7.7
2 in.	2.0	4		80	160	7.7
Residential Fire Sprinkler w/ strainer						
¾ in.	0.5	2	N/A	15	30	14.5
1 in.	0.75	2		25	50	15.3
1½ in.	1.5	3		50	100	11
2 in.	2.0	4		80	160	11

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

* Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

Table 6-2 Typical uses for each type of meter classification

Meter Type	Typical Use
Positive displacement, fluidic oscillator, multijet, singlejet, static, turbine, electromagnetic, or ultrasonic	Single-family residential, apartment buildings with fewer than 100 units; small businesses (e.g., filling stations, restaurants, small hotels, motels, small office buildings, retail stores, etc.); schools and other public buildings without large irrigation demands
Turbine, singlejets, static, electromagnetic or ultrasonic	Large hotels, factories, hospitals, irrigation, large office buildings, pump discharge, laundries, nursing homes
Compound, singlejets, turbine, multijet, static, electromagnetic or ultrasonic	Schools (with irrigation), apartment buildings with more than 100 units, dormitories, assisted living centers, retail shopping centers
Residential fire meters	One- and two-family dwellings and manufactured homes (NFPA 13D applications)
Fire-line meters	Fire service (for various NFPA 13 and NFPA 13R applications)
Differential pressure (venturi, flow tube), electromagnetic or ultrasonic meters	Pump discharge, wholesale water purchasers, research applications, subsystem metering



Water Meter Sizing per AWWA M22, Third Edition

Project: Edgepoint 3 - Bldg 3
 Client: _____
 Address: _____
 City: _____ State: _____ Zip Code: _____
 Type of Occupancy: Multi-family apartments - 65 unit

Fixture	Fixture Value 60 psi		No. of Fixtures		Fixture Value
Bathtub	8	x	78	=	624
Bedpan Washers	10	x		=	
Bidet	2	x		=	
Dental Unit	2	x		=	
Drinking Fountain – Public	2	x		=	
Kitchen Sink	1.5	x	65	=	97.5
Lavatory	.5	x	91	=	45
Showerhead (Shower Only)	1.75	x		=	
Service Sink	4	x		=	
Toilet – Flush Valve	35	x		=	
– Tank Type	4	x	78	=	312
Urinal – Pedestal Flush Valve	35	x		=	
– Wall Flush Valve	16	x		=	
Wash Sink (Each Set of Faucets)	4	x		=	
Dishwasher	2	x	65	=	130
Washing Machine	6	x	65	=	390
Hose (50 ft. Wash Down) – ½ in.	5	x		=	
– ⅝ in.	9	x		=	
– ¾ in.	12	x	2	=	24

Combined Fixture Total 1623

Water-flow Demand per Fixture Value from Figure 4-2 or 4-3 x Pressure Adjustment Factor = 70 gpm
**For Residual Pressures at Fixture Outlet from 60-80 psi, Pressure Adjustment Factor is 1.00 per Table 4-3*

Add Irrigation – _____ Sections* x 1.16 or 0.40† = _____ gpm
 – _____ Hose Bibs x Fixture Value x _____ Press. Adj. Factor = _____ gpm
 Added Fixed Load = _____ gpm
 TOTAL FIXED DEMAND = _____ gpm

*100 ft² area = 1 section
 †Spray systems – Use 1.16; Rotary systems – Use 0.40

Meter size chosen per Table 6-1 = 2 in.

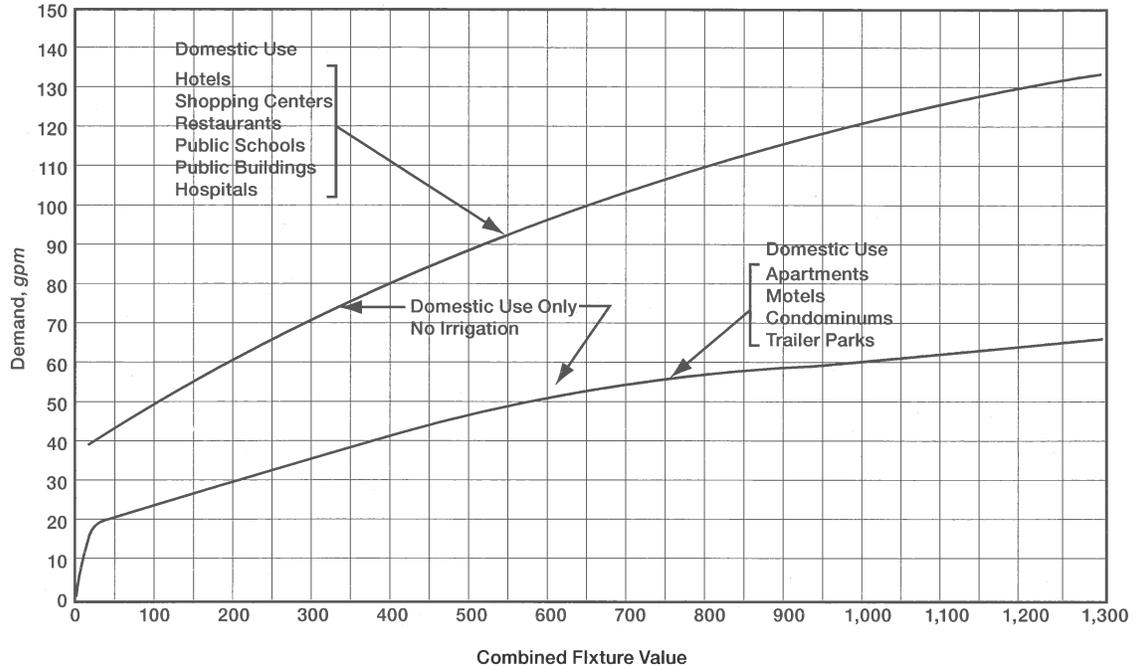


Figure 4-2 Water-flow demand per fixture value—enlarged scale from Figure 4-1

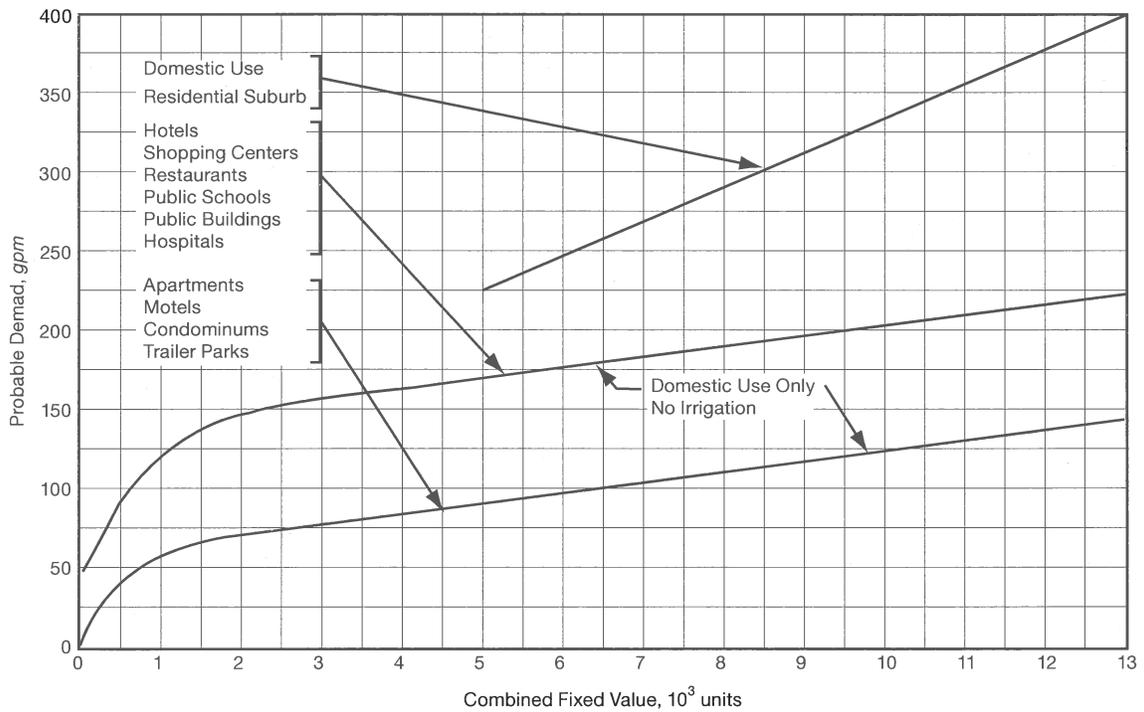


Figure 4-3 Water-flow demand per fixture value

Table 4-3 Example of fixture value adjustment for pressure (based on Figure 4-6)

Kitchen Faucet Fixture Value Adjustment				
Residual Pressure at Fixture Outlet, <i>psi</i>	Baseline Flow Rate at 60 <i>psi</i>	Actual Flow Rate at Residual Pressure (Fixture Value)	Pressure Adjustment Factor	
15	1.8	1.0	0.56	
20	1.8	1.1	0.61	
25	1.8	1.2	0.67	
30	1.8	1.3	0.72	
35	1.8	1.4	0.78	
40	1.8	1.5	0.83	
50	1.8	1.7	0.94	
60	1.8	1.8	1.00	
70	1.8	1.8	1.00	
80	1.8	1.8	1.00	

Table 6-1 AWWA meter standards

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
Positive displacement						
½ in.	0.25	1	N/A	7.5	15	15
⅝ in.	0.25	1		10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Multijet						
⅝ in.	0.25	1	N/A	10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Turbine class II						
1½ in.	N/A	4	N/A	90	120	7
2 in.		4		160	190	7
3 in.		8		350	435	7
4 in.		15		650	750	7
6 in.		30		1,400	1,600	7
8 in.		50		2,400	2,800	7
10 in.		75		3,500	4,200	7
12 in.		120		4,400	5,300	7
16 in.		200		6,500	7,800	7
20 in.		300		10,000	12,000	7
Compound class II						
2 in.	0.25	1	13	80	160	15
3 in.	0.50	2	15	175	350	15
4 in.	0.75	3	18	300	600	15
6 in.	1.50	5	20	675	1,350	15
8 in.	2.00	16	35	900	1,600	15
Fire service, type II—compound						
3 in.	* see note	2	30	250	350	12
4 in.		4	40	400	700	12
6 in.		5	90	900	1,600	12
8 in.		8	150	1,600	2,800	12
10 in.		8	200	2,200	4,400	12

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

*Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

(Table continued on next page.)

Table 6-1 AWWA meter standards (continued)

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
Fire service, type III—turbine						
3 in.	4	5	N/A	250	350	11
4 in.	10	15		400	700	11
6 in.	20	30		900	1,600	11
8 in.	30	35		1,600	2,800	11
10 in.	35	55		2,500	4,400	11
Propeller (main line)						
2 in.	N/A	45	N/A	100	120	5
3 in.		80		250	300	5
4 in.		85		500	600	2
6 in.		160		1,200	1,350	1
8 in.		190		1,500	1,800	0.5
10 in.		260		2,000	2,400	0.5
12 in.		275		2,800	3,375	0.5
14 in.		350		3,750	4,500	0.5
16 in.		450		4,750	5,700	0.5
18 in.		550		5,625	6,750	0.25
20 in.		650		6,875	8,250	0.25
24 in.		1,000		10,000	12,000	0.25
30 in.		1,600		15,000	18,000	0.25
36 in.		2,400		20,000	24,000	0.25
42 in.		2,800		28,000	40,000	0.1
48 in.		3,500		35,000	50,000	0.1
54 in.		5,000		45,000	55,000	0.1
60 in.		6,000		60,000	80,000	0.1
66 in.		7,500		75,000	95,000	0.1
72 in.		9,000		90,000	115,000	0.1
Fluidic oscillator						
½ in.	0.25	1	N/A	7.5	15	15
⅝ in.	0.25	1		10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Singlejet						
⅝ in.	0.25	1	N/A	10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		20	40	15
1½ in.	0.50	1.5	N/A	50	100	15

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

* Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

(Table continued on next page.)

Table 6-1 AWWA meter standards (continued)

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
2 in.	0.50	2.0		80	160	15
3 in.	0.50	2.5		160	320	15
4 in.	0.75	3.0		250	500	15
6 in.	1.50	4.0		500	1,000	15
Residential Fire Sprinkler						
¾ in.	0.5	2	N/A	15	30	10.1
1 in.	0.75	2		25	50	10.7
1½ in.	1.5	3		50	100	7.7
2 in.	2.0	4		80	160	7.7
Residential Fire Sprinkler w/ strainer						
¾ in.	0.5	2	N/A	15	30	14.5
1 in.	0.75	2		25	50	15.3
1½ in.	1.5	3		50	100	11
2 in.	2.0	4		80	160	11

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

* Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

Table 6-2 Typical uses for each type of meter classification

Meter Type	Typical Use
Positive displacement, fluidic oscillator, multijet, singlejet, static, turbine, electromagnetic, or ultrasonic	Single-family residential, apartment buildings with fewer than 100 units; small businesses (e.g., filling stations, restaurants, small hotels, motels, small office buildings, retail stores, etc.); schools and other public buildings without large irrigation demands
Turbine, singlejets, static, electromagnetic or ultrasonic	Large hotels, factories, hospitals, irrigation, large office buildings, pump discharge, laundries, nursing homes
Compound, singlejets, turbine, multijet, static, electromagnetic or ultrasonic	Schools (with irrigation), apartment buildings with more than 100 units, dormitories, assisted living centers, retail shopping centers
Residential fire meters	One- and two-family dwellings and manufactured homes (NFPA 13D applications)
Fire-line meters	Fire service (for various NFPA 13 and NFPA 13R applications)
Differential pressure (venturi, flow tube), electromagnetic or ultrasonic meters	Pump discharge, wholesale water purchasers, research applications, subsystem metering



Water Meter Sizing per AWWA M22, Third Edition

Project: Edgepoint 3 - Bldg 4
 Client: _____
 Address: _____
 City: _____ State: _____ Zip Code: _____
 Type of Occupancy: Multi-family apartments - 50 unit

Fixture	Fixture Value 60 psi		No. of Fixtures	=	Fixture Value
Bathtub	8	x	60	=	480
Bedpan Washers	10	x		=	
Bidet	2	x		=	
Dental Unit	2	x		=	
Drinking Fountain – Public	2	x		=	
Kitchen Sink	1.5	x	50	=	75
Lavatory	.5	x	70	=	35
Showerhead (Shower Only)	1.75	x		=	
Service Sink	4	x		=	
Toilet – Flush Valve	35	x		=	
– Tank Type	4	x	60	=	240
Urinal – Pedestal Flush Valve	35	x		=	
– Wall Flush Valve	16	x		=	
Wash Sink (Each Set of Faucets)	4	x		=	
Dishwasher	2	x	50	=	100
Washing Machine	6	x	50	=	300
Hose (50 ft. Wash Down) – ½ in.	5	x		=	
– ⅝ in.	9	x		=	
– ¾ in.	12	x	2	=	24

Combined Fixture Total 1254

Water-flow Demand per Fixture Value from Figure 4-2 or 4-3 x Pressure Adjustment Factor = 65 gpm
**For Residual Pressures at Fixture Outlet from 60-80 psi, Pressure Adjustment Factor is 1.00 per Table 4-3*

Add Irrigation – _____ Sections* x 1.16 or 0.40† = _____ gpm
 – _____ Hose Bibs x Fixture Value x _____ Press. Adj. Factor = _____ gpm
 Added Fixed Load = _____ gpm
 TOTAL FIXED DEMAND = _____ gpm

*100 ft² area = 1 section
 †Spray systems – Use 1.16; Rotary systems – Use 0.40

Meter size chosen per Table 6-1 = 1.5 in.

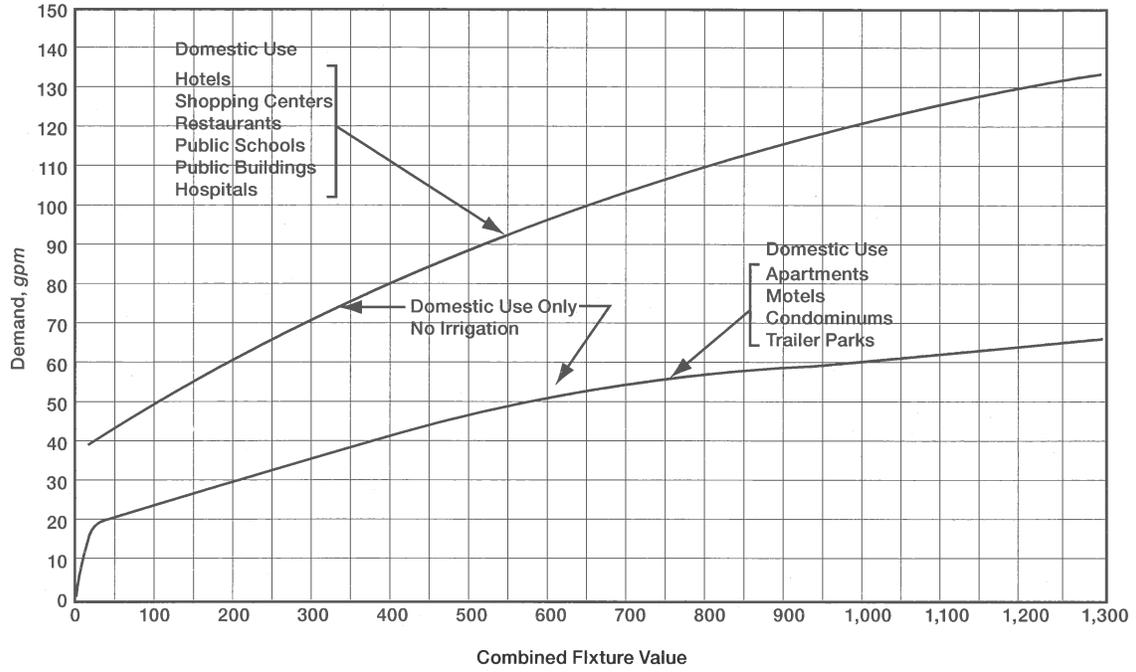


Figure 4-2 Water-flow demand per fixture value—enlarged scale from Figure 4-1

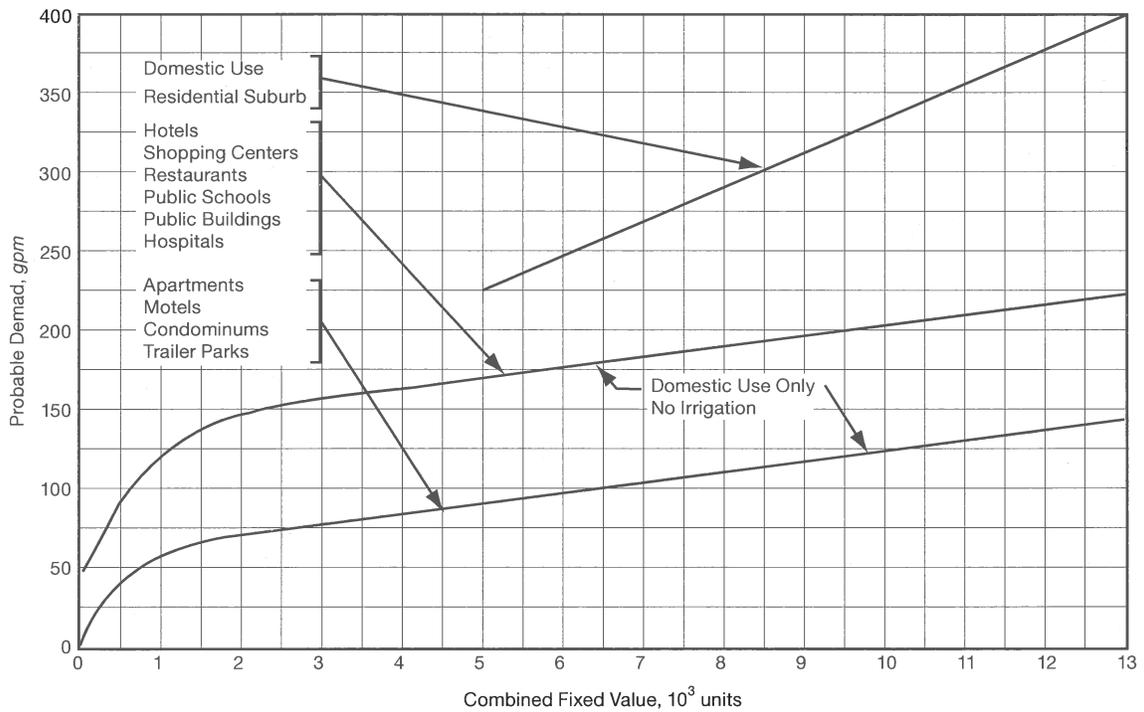


Figure 4-3 Water-flow demand per fixture value

Table 4-3 Example of fixture value adjustment for pressure (based on Figure 4-6)

Kitchen Faucet Fixture Value Adjustment				
Residual Pressure at Fixture Outlet, <i>psi</i>	Baseline Flow Rate at 60 <i>psi</i>	Actual Flow Rate at Residual Pressure (Fixture Value)	Pressure Adjustment Factor	
15	1.8	1.0	0.56	
20	1.8	1.1	0.61	
25	1.8	1.2	0.67	
30	1.8	1.3	0.72	
35	1.8	1.4	0.78	
40	1.8	1.5	0.83	
50	1.8	1.7	0.94	
60	1.8	1.8	1.00	
70	1.8	1.8	1.00	
80	1.8	1.8	1.00	

Table 6-1 AWWA meter standards

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
Positive displacement						
½ in.	0.25	1	N/A	7.5	15	15
⅝ in.	0.25	1		10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Multijet						
⅝ in.	0.25	1	N/A	10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Turbine class II						
1½ in.	N/A	4	N/A	90	120	7
2 in.		4		160	190	7
3 in.		8		350	435	7
4 in.		15		650	750	7
6 in.		30		1,400	1,600	7
8 in.		50		2,400	2,800	7
10 in.		75		3,500	4,200	7
12 in.		120		4,400	5,300	7
16 in.		200		6,500	7,800	7
20 in.		300		10,000	12,000	7
Compound class II						
2 in.	0.25	1	13	80	160	15
3 in.	0.50	2	15	175	350	15
4 in.	0.75	3	18	300	600	15
6 in.	1.50	5	20	675	1,350	15
8 in.	2.00	16	35	900	1,600	15
Fire service, type II—compound						
3 in.	* see note	2	30	250	350	12
4 in.		4	40	400	700	12
6 in.		5	90	900	1,600	12
8 in.		8	150	1,600	2,800	12
10 in.		8	200	2,200	4,400	12

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

*Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

(Table continued on next page.)

Table 6-1 AWWA meter standards (continued)

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
Fire service, type III—turbine						
3 in.	4	5	N/A	250	350	11
4 in.	10	15		400	700	11
6 in.	20	30		900	1,600	11
8 in.	30	35		1,600	2,800	11
10 in.	35	55		2,500	4,400	11
Propeller (main line)						
2 in.	N/A	45	N/A	100	120	5
3 in.		80		250	300	5
4 in.		85		500	600	2
6 in.		160		1,200	1,350	1
8 in.		190		1,500	1,800	0.5
10 in.		260		2,000	2,400	0.5
12 in.		275		2,800	3,375	0.5
14 in.		350		3,750	4,500	0.5
16 in.		450		4,750	5,700	0.5
18 in.		550		5,625	6,750	0.25
20 in.		650		6,875	8,250	0.25
24 in.		1,000		10,000	12,000	0.25
30 in.		1,600		15,000	18,000	0.25
36 in.		2,400		20,000	24,000	0.25
42 in.		2,800		28,000	40,000	0.1
48 in.		3,500		35,000	50,000	0.1
54 in.		5,000		45,000	55,000	0.1
60 in.		6,000		60,000	80,000	0.1
66 in.		7,500		75,000	95,000	0.1
72 in.		9,000		90,000	115,000	0.1
Fluidic oscillator						
½ in.	0.25	1	N/A	7.5	15	15
⅝ in.	0.25	1		10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Singlejet						
⅝ in.	0.25	1	N/A	10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		20	40	15
1½ in.	0.50	1.5	N/A	50	100	15

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

* Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

(Table continued on next page.)

Table 6-1 AWWA meter standards (continued)

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
2 in.	0.50	2.0		80	160	15
3 in.	0.50	2.5		160	320	15
4 in.	0.75	3.0		250	500	15
6 in.	1.50	4.0		500	1,000	15
Residential Fire Sprinkler						
¾ in.	0.5	2	N/A	15	30	10.1
1 in.	0.75	2		25	50	10.7
1½ in.	1.5	3		50	100	7.7
2 in.	2.0	4		80	160	7.7
Residential Fire Sprinkler w/ strainer						
¾ in.	0.5	2	N/A	15	30	14.5
1 in.	0.75	2		25	50	15.3
1½ in.	1.5	3		50	100	11
2 in.	2.0	4		80	160	11

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

* Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

Table 6-2 Typical uses for each type of meter classification

Meter Type	Typical Use
Positive displacement, fluidic oscillator, multijet, singlejet, static, turbine, electromagnetic, or ultrasonic	Single-family residential, apartment buildings with fewer than 100 units; small businesses (e.g., filling stations, restaurants, small hotels, motels, small office buildings, retail stores, etc.); schools and other public buildings without large irrigation demands
Turbine, singlejets, static, electromagnetic or ultrasonic	Large hotels, factories, hospitals, irrigation, large office buildings, pump discharge, laundries, nursing homes
Compound, singlejets, turbine, multijet, static, electromagnetic or ultrasonic	Schools (with irrigation), apartment buildings with more than 100 units, dormitories, assisted living centers, retail shopping centers
Residential fire meters	One- and two-family dwellings and manufactured homes (NFPA 13D applications)
Fire-line meters	Fire service (for various NFPA 13 and NFPA 13R applications)
Differential pressure (venturi, flow tube), electromagnetic or ultrasonic meters	Pump discharge, wholesale water purchasers, research applications, subsystem metering



Water Meter Sizing per AWWA M22, Third Edition

Project: Edgepoint 3 - Bldg 4
 Client: _____
 Address: _____
 City: _____ State: _____ Zip Code: _____
 Type of Occupancy: Multi-family apartments - 50 unit

Fixture	Fixture Value 60 psi		No. of Fixtures		Fixture Value
Bathtub	8	x	50	=	480
Bedpan Washers	10	x		=	
Bidet	2	x		=	
Dental Unit	2	x		=	
Drinking Fountain – Public	2	x		=	
Kitchen Sink	1.5	x	30	=	45
Lavatory	.5	x	70	=	35
Showerhead (Shower Only)	1.75	x		=	
Service Sink	4	x		=	
Toilet – Flush Valve	35	x		=	
– Tank Type	4	x	50	=	200
Urinal – Pedestal Flush Valve	35	x		=	
– Wall Flush Valve	16	x		=	
Wash Sink (Each Set of Faucets)	4	x		=	
Dishwasher	2	x	30	=	60
Washing Machine	6	x	30	=	180
Hose (50 ft. Wash Down) – ½ in.	5	x		=	
– ⅝ in.	9	x		=	
– ¾ in.	12	x	2	=	24

Combined Fixture Total 1024

Water-flow Demand per Fixture Value from Figure 4-2 or 4-3 x Pressure Adjustment Factor = 60 gpm
**For Residual Pressures at Fixture Outlet from 60-80 psi, Pressure Adjustment Factor is 1.00 per Table 4-3*

Add Irrigation – _____ Sections* x 1.16 or 0.40† = _____ gpm
 – _____ Hose Bibs x Fixture Value x _____ Press. Adj. Factor = _____ gpm
 Added Fixed Load = _____ gpm
 TOTAL FIXED DEMAND = _____ gpm

*100 ft² area = 1 section
 †Spray systems – Use 1.16; Rotary systems – Use 0.40

Meter size chosen per Table 6-1 = 1.5 in.

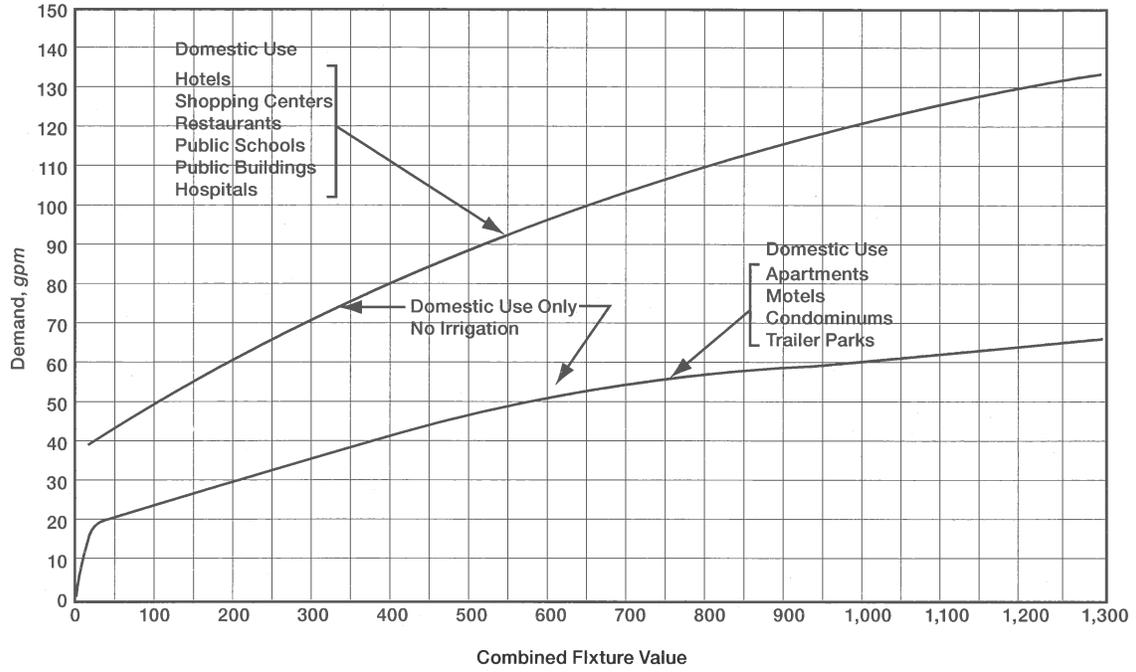


Figure 4-2 Water-flow demand per fixture value—enlarged scale from Figure 4-1

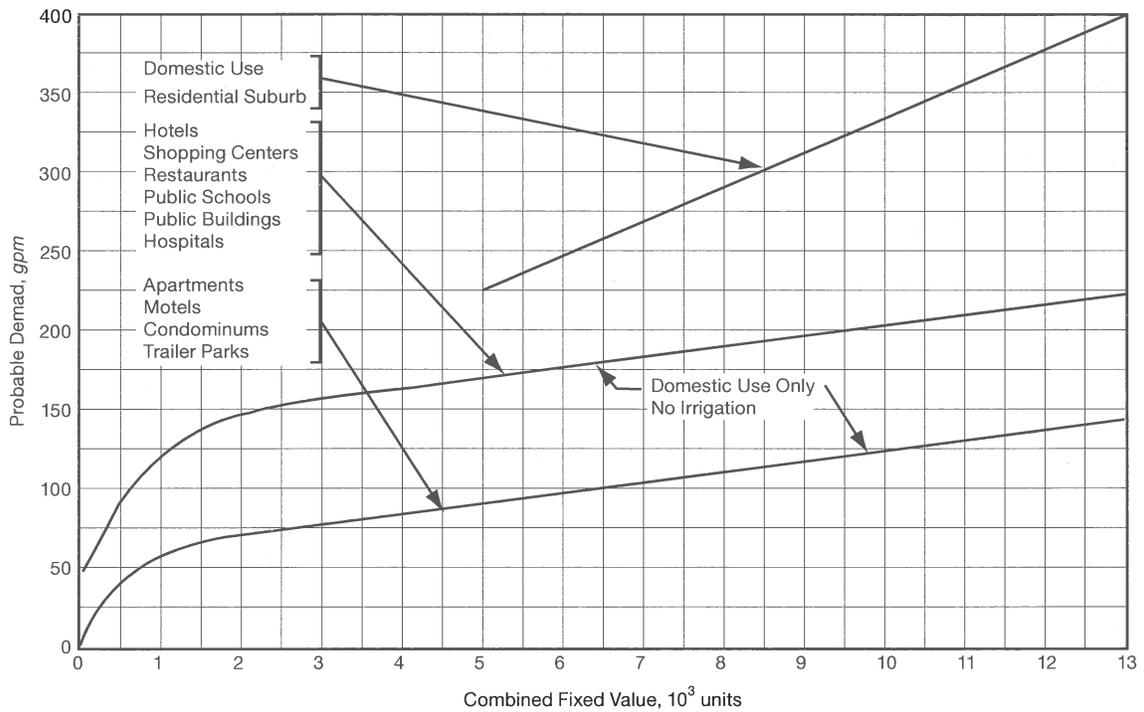


Figure 4-3 Water-flow demand per fixture value

Table 4-3 Example of fixture value adjustment for pressure (based on Figure 4-6)

Kitchen Faucet Fixture Value Adjustment				
Residual Pressure at Fixture Outlet, <i>psi</i>	Baseline Flow Rate at 60 <i>psi</i>	Actual Flow Rate at Residual Pressure (Fixture Value)	Pressure Adjustment Factor	
15	1.8	1.0	0.56	
20	1.8	1.1	0.61	
25	1.8	1.2	0.67	
30	1.8	1.3	0.72	
35	1.8	1.4	0.78	
40	1.8	1.5	0.83	
50	1.8	1.7	0.94	
60	1.8	1.8	1.00	
70	1.8	1.8	1.00	
80	1.8	1.8	1.00	

Table 6-1 AWWA meter standards

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
Positive displacement						
½ in.	0.25	1	N/A	7.5	15	15
⅝ in.	0.25	1		10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Multijet						
⅝ in.	0.25	1	N/A	10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Turbine class II						
1½ in.	N/A	4	N/A	90	120	7
2 in.		4		160	190	7
3 in.		8		350	435	7
4 in.		15		650	750	7
6 in.		30		1,400	1,600	7
8 in.		50		2,400	2,800	7
10 in.		75		3,500	4,200	7
12 in.		120		4,400	5,300	7
16 in.		200		6,500	7,800	7
20 in.		300		10,000	12,000	7
Compound class II						
2 in.	0.25	1	13	80	160	15
3 in.	0.50	2	15	175	350	15
4 in.	0.75	3	18	300	600	15
6 in.	1.50	5	20	675	1,350	15
8 in.	2.00	16	35	900	1,600	15
Fire service, type II—compound						
3 in.	* see note	2	30	250	350	12
4 in.		4	40	400	700	12
6 in.		5	90	900	1,600	12
8 in.		8	150	1,600	2,800	12
10 in.		8	200	2,200	4,400	12

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

*Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

(Table continued on next page.)

Table 6-1 AWWA meter standards (continued)

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
Fire service, type III—turbine						
3 in.	4	5	N/A	250	350	11
4 in.	10	15		400	700	11
6 in.	20	30		900	1,600	11
8 in.	30	35		1,600	2,800	11
10 in.	35	55		2,500	4,400	11
Propeller (main line)						
2 in.	N/A	45	N/A	100	120	5
3 in.		80		250	300	5
4 in.		85		500	600	2
6 in.		160		1,200	1,350	1
8 in.		190		1,500	1,800	0.5
10 in.		260		2,000	2,400	0.5
12 in.		275		2,800	3,375	0.5
14 in.		350		3,750	4,500	0.5
16 in.		450		4,750	5,700	0.5
18 in.		550		5,625	6,750	0.25
20 in.		650		6,875	8,250	0.25
24 in.		1,000		10,000	12,000	0.25
30 in.		1,600		15,000	18,000	0.25
36 in.		2,400		20,000	24,000	0.25
42 in.		2,800		28,000	40,000	0.1
48 in.		3,500		35,000	50,000	0.1
54 in.		5,000		45,000	55,000	0.1
60 in.		6,000		60,000	80,000	0.1
66 in.		7,500		75,000	95,000	0.1
72 in.		9,000		90,000	115,000	0.1
Fluidic oscillator						
½ in.	0.25	1	N/A	7.5	15	15
⅝ in.	0.25	1		10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		25	50	15
1½ in.	1.50	5		50	100	15
2 in.	2.00	8		80	160	15
Singlejet						
⅝ in.	0.25	1	N/A	10	20	15
¾ in.	0.50	2		15	30	15
1 in.	0.75	3		20	40	15
1½ in.	0.50	1.5	N/A	50	100	15

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

* Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

(Table continued on next page.)

Table 6-1 AWWA meter standards (continued)

Meter	Minimum Flow Rate, <i>gpm</i>	Low-Normal Flow Rate, <i>gpm</i>	Change-over Range (Compound Meters)	High-Normal Flow Rate, <i>gpm</i>	Maximum Flow Rate <i>gpm</i>	Head Loss at Maximum Flow, <i>psi</i>
2 in.	0.50	2.0		80	160	15
3 in.	0.50	2.5		160	320	15
4 in.	0.75	3.0		250	500	15
6 in.	1.50	4.0		500	1,000	15
Residential Fire Sprinkler						
¾ in.	0.5	2	N/A	15	30	10.1
1 in.	0.75	2		25	50	10.7
1½ in.	1.5	3		50	100	7.7
2 in.	2.0	4		80	160	7.7
Residential Fire Sprinkler w/ strainer						
¾ in.	0.5	2	N/A	15	30	14.5
1 in.	0.75	2		25	50	15.3
1½ in.	1.5	3		50	100	11
2 in.	2.0	4		80	160	11

Source: Data are drawn from AWWA Standards C700, C701, C702, C703, C704, C708, C710, C712, C713, and C714, latest revision.

N/A = not applicable.

* Minimum flow rate is per the applicable AWWA standard for the bypass meter employed.

Table 6-2 Typical uses for each type of meter classification

Meter Type	Typical Use
Positive displacement, fluidic oscillator, multijet, singlejet, static, turbine, electromagnetic, or ultrasonic	Single-family residential, apartment buildings with fewer than 100 units; small businesses (e.g., filling stations, restaurants, small hotels, motels, small office buildings, retail stores, etc.); schools and other public buildings without large irrigation demands
Turbine, singlejets, static, electromagnetic or ultrasonic	Large hotels, factories, hospitals, irrigation, large office buildings, pump discharge, laundries, nursing homes
Compound, singlejets, turbine, multijet, static, electromagnetic or ultrasonic	Schools (with irrigation), apartment buildings with more than 100 units, dormitories, assisted living centers, retail shopping centers
Residential fire meters	One- and two-family dwellings and manufactured homes (NFPA 13D applications)
Fire-line meters	Fire service (for various NFPA 13 and NFPA 13R applications)
Differential pressure (venturi, flow tube), electromagnetic or ultrasonic meters	Pump discharge, wholesale water purchasers, research applications, subsystem metering