

4715.3800 RECOMMENDED GUIDE FOR SIZING WATER SUPPLY SYSTEM.

Subpart 1. **Conditions to be determined.** On any proposed water piping installation sized pursuant to subpart 9, the following conditions shall be determined:

A. Total number of fixture units as determined from the table of equivalent fixture units (subpart 8) for the fixtures to be installed.

B. Developed length of supply pipe from meter to most remote outlet, or if the pressure at the meter is unknown, use the developed length from the street main to most remote outlet.

C. Difference in elevation between the meter or other source of supply and the highest fixture or outlet.

D. Pressure in the street main or other source of supply at the locality where the installation is to be made. Calculations shall be based on not to exceed 100 psi pressure in the system.

E. In localities where there is a wide fluctuation of pressure in the main throughout the day, the water piping systems shall be designed on the basis of the minimum pressure available.

Subp. 2. **Size of street service, meter and building supply pipe using subpart 9.** Knowing the available pressure at the water meter, water main, or other source of supply, and after subtracting one-half pound per square inch pressure for each foot of difference in elevation between such source of supply and the highest water supply outlet in the building or on the premises, use the "pressure range" group within which this pressure will fall. Select the "length" column which is equal to or longer than the required length. Follow down the column to a fixture unit value equal to or greater than the total number of fixture units required by the installation. Having located the proper fixture unit value for the required length, sizes of meter and building supply pipe will be found in the two left-hand columns.

Subp. 3. **Size of branches.** The size of each branch shall be determined by the number of fixture units to be served by that branch, following the methods in subpart 2.

Subp. 4. **Sizing for flushometer valves.** Branches and mains serving water closet or similar flushometer valves may be sized from subpart 9 when the following values are assigned to each flushometer valve beginning with the most remote valve on each branch:

- A. for the first flushometer valve, 40 fixture units;
- B. for the second flushometer valve, 30 fixture units;
- C. for the third flushometer valve, 20 fixture units;
- D. for the fourth flushometer valve, 15 fixture units; and
- E. for the fifth flushometer valve, ten fixture units.

After the fifth valve on any branch, subsequent loadings may be computed using the values given in subpart 8 of this chapter. Piping supplying a flushometer valve shall not be less in size than the valve inlet.

Subp. 5. **Hot water sizing.** In sizing the hot water piping or water supply systems from subpart 9, the greatest developed length of the cold water supply piping may be used and the length of the hot water piping ignored when the hot water piping friction loss is compensated for by the following method:

A. Compute the total hot water fixture unit demand, using those values given in subpart 8 for the combined hot and cold water use.

B. Assign the total demand computed as required in item A, as the fixture unit demand at the hot water heater supply branch and inlet.

Subp. 6. **Cold water piping.** Starting at the most remote outlet on the cold water piping and working back toward the water meter, compute the pipe sizing for the system from the column originally selected in subpart 9, using the fixture unit values given in subpart 8, and adding in the fixture unit demand of the hot water heater supply inlet as computed in subpart 5, at the point where it occurs. The final size of the cold water main need not be larger than the originally established size required by subpart 9 for the total building supply.

Subp. 7. **Hot water piping.** Starting at the most remote outlets on the hot water piping and working back toward the water heater, compute the pipe sizing for the system from the column originally selected in subpart 9, using the fixture unit values given in subpart 8.

Subp. 8. **Equivalent fixture units, including combined hot and cold water demand.**

Fixture	Number of Private Use	Fixture Unit Public Use
Bar sink	1	2
Bathtub (with or without shower over)	2	4
Dental unit or cuspidor	–	1
Drinking fountain (each head)	–	1
Hose Bibb or sill cock (standard type)	3	5
House trailer (each)	6	6
Laundry tub or clothes washer (each pair of faucets)	2	4
Service sink	–	4
Lavatory	1	2

Lavatory (dental)	1	1
Lawn sprinklers (standard type, each head)	1	1
Shower (each head)	2	4
Sink (bar)	1	2
Sink or dishwasher	2	4
Sink (flushing rim, clinic)	—	10
Sink (washup, each set of faucets)	—	2
Sink (washup, circular spray)	—	4
Urinal (pedestal or similar type)	—	10
Urinal (stall)	—	5
Urinal (wall)	—	5
Urinal (flush tank)	—	3
Water closet (flush tank)	3	5
Water closet (flushometer valve)	—	10

Water supply outlets for items not listed above shall be computed at their maximum demand, but in no case less than:

3/8 inch	1	2
1/2 inch	2	4
3/4 inch	3	6
1 inch	6	10

* See subpart 4 for method of sizing flushometer valve installations using this subpart.

Subp. 9. **Fixture unit table for determining water pipe and meter sizes for water supply systems.**

Pressure Range—30 to 45 psi

Meter & Street Service	Building Supply & Branches	Maximum Allowable Length in Feet									
		40	60	80	100	150	200	250	300	400	500
3/4"	1/2"	6	5	4	4	3	2	—	—	—	—
3/4"	3/4"	18	16	14	12	9	6	—	—	—	—
3/4"	1"	29	25	23	21	17	15	13	12	10	9
1"	1"	36	31	27	25	20	17	15	13	12	10
1"	1 1/4"	54	47	42	38	32	28	25	23	19	17
1 1/4"	1 1/4"	90	68	57	48	38	32	28	25	21	19
1 1/4"	1 1/2"	151	124	105	91	70	57	49	45	36	31
2"	1 1/2"	210	162	132	110	80	64	53	46	38	32
1 1/2"	2"	220	205	190	176	155	138	127	120	105	96
2"	2"	372	329	292	265	217	185	164	147	124	107
2"	2 1/2"	445	418	390	370	330	300	280	265	240	220

Pressure Range—46 to 60 psi

3/4"	1/2"	9	8	7	6	5	4	3	2	—	—
3/4"	3/4"	27	23	19	17	14	11	9	8	6	5
3/4"	1"	44	40	36	33	28	23	21	19	17	14
1"	1"	60	47	41	36	30	25	23	20	18	15
1"	1 1/4"	102	87	76	67	52	44	39	36	30	27
1 1/4"	1 1/4"	168	130	106	89	66	52	44	39	33	29
1 1/4"	1 1/2"	270	225	193	167	128	105	90	68	62	52
2"	1 1/2"	360	290	242	204	150	117	98	84	67	55
1 1/2"	2"	380	360	340	318	272	240	220	198	170	146
2"	2"	570	510	470	430	368	318	280	250	205	173
2"	2 1/2"	680	640	610	580	535	500	470	440	400	365

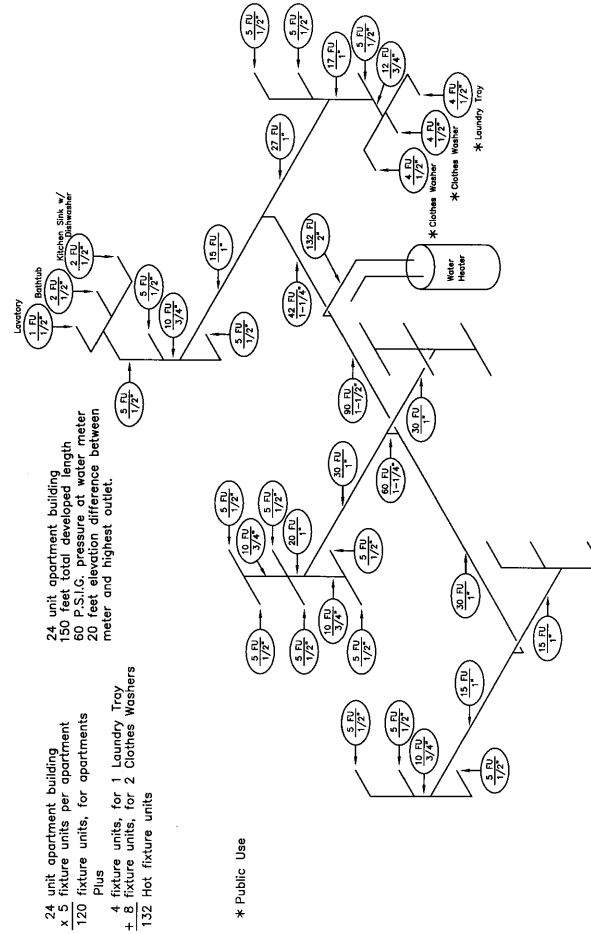
Pressure Range—Over 60 psi

3/4"	1/2"	11	9	8	7	6	5	4	3	2	—
3/4"	3/4"	34	28	24	22	17	13	11	10	8	—
3/4"	1"	63	53	47	42	35	30	27	24	21	18
1"	1"	87	66	55	48	38	32	29	26	22	19
1"	1 1/4"	140	126	108	96	74	62	53	47	39	34
1 1/4"	1 1/4"	237	183	150	127	93	74	62	54	43	37
1 1/4"	1 1/2"	366	311	273	240	186	154	130	113	88	73
2"	1 1/2"	490	395	333	275	220	170	142	122	98	82
1 1/2"	2"	*380	*380	*380	*380	370	335	305	282	244	212
2"	2"	*690	670	610	560	478	420	375	340	288	245
2"	2 1/2"	*690	*690	*690	*690	*690	650	610	570	510	460

*Maximum Allowable Load on Meter.

Subp. 10. [Repealed, 28 SR 146]

Subp. 10a. **Example of cold water sizing using subpart 9.**



Statutory Authority: *MS s 16B.59; 16B.61; 16B.64; 326.37 to 326.45; 326B.101; 326B.106; 326B.13; 326B.43 to 326B.49*

History: *28 SR 146; L 2007 c 140 art 4 s 61; art 6 s 15; art 13 s 4*

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