Chapter Comm 25

PLUMBING

Well Water Supply

Private well construction standards are regulated by the Department of Natural Resources through Chapter NR 812. Some counties (zoning, health departments) may also be involved in enforcement of well requirements.

Maximum Residential Water Heater Temperature Settings

Various state legislation regulates residential water heater settings. Although there are no inspection responsibilities for inspectors, you may be interested in these requirements. They require:

- Manufacturers to set water heater thermostats no higher than 125dF and to affix labels to heaters warning of the dangers and costs of higher settings. (s. 134.81, Wis. Stats.)
- Gas or electric public utilities to send an annual notice to customers on the dangers and costs of higher thermostat settings. (s. 196.373, Wis. Stats.)
- Landlords to set water heater thermostats no higher than 125°F (or at the minimum setting if that is over 125°F) before any new tenant occupies the premises. (s. 704.06, Wis. Stats.)

For further information, contact the Wisconsin Department of Agriculture, Trade and Consumer Protection, (608) 267-9512 or (800) 422-7128.

Section Comm 82.10 (2) of the Plumbing Code, referenced by s. Comm 25.01, requires that if a dwelling is connected to a private on-site waste treatment system (POWTS) or public sewer, then it shall be provided with a water closet, wash basin, kitchen sink and bathtub or shower. These fixtures shall be piped with an adequate water supply. A non-water based alternative to the water closet, such as a privy or composting or incinerating toilet may be installed per Ch. Comm 91, Sanitation, if not prohibited by the county or municipality.

Unless required by the county or municipality, a dwelling not served by a POWTS or public sewer does not require any plumbing fixtures. However, the dwelling shall be provided with an adequate source of potable water. If not prohibited by the county or municipality, it may be provided with an alternative non-water based toilet per Ch. Comm 91.

As before, any plumbing work done prior to legal occupancy, not including the installation of alternative non-water based toilets, shall be done by licensed plumbers. After occupancy, any plumbing work shall be done by licensed plumbers or the owner-occupant of a single-family home. Local ordinances may require post-occupancy plumbing work to be done only by licensed plumbers.

Water Calc. Worksheet _____

Name of Project

INFORMATION REQUIRED TO SIZE WATER SERVICE AND WATER DISTRIBUTION:

1-	Demand of building in water supply fixture units (WSFU);	(WSFU) _____
1.a.	Demand of building in WSFU converted to Gallons Per Minute: (Table 82.40-3)	(GPM) _____
2-	Elevation difference from main or external pressure tank to building control valve; (feet)	_____
3-	Size of water meter (when required) 5/8"___ 3/4"____ 1"____ other_____	_____
4-	Developed length from main or external pressure tank to building control valve; (feet)	_____
5-	Low pressure at main in street or external pressure tank. (psi)	_____

CALCULATE WATER SERVICE PRESSURE LOSS
(unnecessary for internal pressure tanks)

6- Low pressure at main in street or external pressure tank. (value of # 5 above) _____

7- Determine pressure loss due to friction in _____ inch diameter water service.
Water service piping material is _____
Pressure loss per 100 ft. = _____ X _____ (decimal equivalent of service length, i.e. 65 ft = 0.65) **Subtract value of "7"** _____

Subtotal _____

8- Determine pressure loss or gain due to elevation, (multiply the value of # 2 above by .434) **Subtract value of "8"** _____

9- Available pressure after the bldg. control valve. Subtotal _____

CALCULATE THE PRESSURE AVAILABLE FOR UNIFORM LOSS (VALUE OF "A")

B. Available pressure after the bldg. control valve. (from "9" above) Value of "B" _____

C. Pressure loss of water meter (when meter is required) **Subtract value of "C"** _____

Subtotal _____

D. Pressure at controlling fixture*.
(Controlling fixture is: _____).
(*Contolling fixture is the fixture with the most demanding pressure to operate properly which includes the following when determining fixture performance; loss due to instantaneous water heaters, water treatment devices, and backflow preventers which serve the controlling fixture.) **Subtract value of "D"** _____

Subtotal _____

E. Difference in elevation between building control valve and the controlling fixture in feet; _____ X .434 psi/ft. **Subtract value of "E"** _____

Subtotal _____

Water Calc Worksheet _____
Name of Project

F. Pressure loss due to water treatment devices and backflow preventers which serve the controlling fixture. (Water softeners, filters, etc.)

(Pressure loss due to; _____

F1. WSFU Downstream of Water Treatment Device; _____

F2. Convert wsfu to GPM using **Table 82.40-3**: _____

or

F3. Convert wsfu to GPM using **Table 82.40-3e*** _____
(For individual dwellings only)

F4. Refer to manuf. graph to obtain pressure loss:
(If no water treatment device enter "0") _____

Subtract value of F4 _____

Subtotal _____

G. Pressure loss through tankless water heaters, combination boiler / hot water heaters, heat exchangers which serve the controlling fixture;

Hot water WSFU's;_____ convert to; GPM = _____ (Table 82.40-3)
Refer to manufacturer's pressure loss graph to determine loss at the required GPM;

_____ pressure loss. **Subtract value of "G"** _____

Subtotal _____

H. Developed length from building control valve to controlling fixture in feet_____ X 1.5 **Divide by value "H"** _____

Subtotal _____

Multiply by: 100

A. Pressure available for uniform loss **"A" =** _____

Water distribution piping is: _____

*Note: The "A" value obtained by using Table 82.40-3e can only be used for an individual dwelling when sizing the water treatment device (water softeners, etc) and no hose bibbs, hydrants, or high flow fixtures are being served by the water treatment device.

Note: High flow fixtures are defined as fixtures that exceed a flow rate of 4 gpm @ 80 psi, and water velocity not exceeding 8 ft. per second.

Instructions For Completing The Water Calculation Worksheet SBD 6479 (R4-09)

1. Demand of building in water supply fixture units (WSFU). Add up WSFU's (Tables 82.40 - 1 & 2).

1.a. Demand of building in WSFU converted to Gallons Per Minute. Convert WSFU's to GPM (Table 82.40 - 3).

2. Determine difference in elevation from main or external pressure tank to building control valve. Ask purveyor depth of main in street, or ask pump installer depth of pipe at connection to external pressure tank.

3. Size of meter (if applicable). Ask purveyor for meter size for GPM demand.

4. Developed length in feet from main or external pressure tank to building control valve. Measure actual distance.

5. Determine low pressure at main in street, or at external pressure tank. Ask purveyor for the low residual pressure of water at address, or ask pump installer low pressure setting on switch.

6. Low pressure at main in street, or external pressure tank (as determined at # 5 above).

7. Determine pressure loss due to friction in the water service. Refer to Comm. 82 Appendix Graphs A82.40 (7) - 2 thru 11.

8. Determine the pressure loss or gain due to the difference in elevation between the main or external pressure tank and the building control valve. Measure difference in height (ft.) from the main or external pressure tank to the building control valve. Multiply height (ft.) by .434.

9. Available pressure after the building control valve (enter in line "B").

B. Available pressure after the building control valve (from line "9").

C. Determine pressure loss of water meter, Comm. 82 Appendix Graph A82.40 (7)-1 or provide manufacturer's loss curve.

D. Pressure at controlling fixture. This is the most demanding pressure required for a fixture to properly operate. Compare; 1. Required fixture pressure, 2. Elevation of fixture, 3. Developed length to fixture.

E. Determine difference in elevation between the building control valve and the controlling fixture. Measure difference in height (ft.) from the building control valve to the controlling fixture. Multiply height (ft.) by .434.

F. Pressure loss due to water treatment devices (water softeners, filters, etc.), and backflow preventers which serve the controlling fixture. Add up the WSFU's downstream of the water treatment device and convert to gpm using Table 82.40-3, or, Table 82.40-3e when serving an individual dwelling. Refer to manufacturer's graph to convert gpm to pressure loss through the WTD, and or a backflow preventer.

G. Pressure loss through tankless water heaters, combination boiler / hot water heaters, heat exchangers which serve the controlling fixture. Add up WSFU's downstream of the heating appliance and convert to GPM using Table 82.40-3. Refer to manufacturer's pressure loss graph to determine loss at the required GPM.

H. Developed length from building control valve to controlling fixture in feet X 1.5. This is the measured length (ft) of pipe between the building control valve and the controlling fixture. Multiply the length (ft) by 1.5.

A. = pressure available for uniform loss. This number is only an indicator for using the pipe sizing Tables 82.40-4 thru 11.

Table 82.40–1
WATER SUPPLY FIXTURE UNITS FOR NONPUBLIC USE FIXTURES

Type of Fixture[a]	Water Supply Fixture Units (wsfu)		
	Hot	Cold	Total
Automatic Clothes Washer	1.0	1.0	1.5
Bar Sink	0.5	0.5	1.0
Bathtub, with or without Shower Head	1.5	1.5	2.0
Bidet	1.0	1.0	1.5
Dishwashing Machine	1.0		1.0
Glass Filler		0.5	0.5
Hose Bibb:			
1/2″ diameter		3.0	3.0
3/4″ diameter		4.0	4.0
Kitchen Sink	1.0	1.0	1.5
Laundry Tray, 1 or 2 Compartment	1.0	1.0	1.5
Lavatory	0.5	0.5	1.0
Manufactured Home	—	15	15
Shower, Per Head	1.0	1.0	1.5
Water Closet, Flushometer Type		6.0	6.0
Water Closet, Gravity Type Flush Tank		2.0	2.0
Bathroom Groups:			
Bathtub, Lavatory and Water Closet–FM[b]	2.0	7.5	8.0
Bathtub, Lavatory and Water Closet–FT[c]	2.0	3.5	4.0
Shower Stall, Lavatory and Water Closet–FM	1.5	7.0	7.5
Shower Stall, Lavatory and Water Closet–FT	1.5	3.0	3.5

Table 82.40–3e
CONVERSION OF WATER SUPPLY FIXTURE UNITS TO GALLONS PER MINUTE FOR WATER TREATMENT DEVICES[a] SERVING AN INDIVIDUAL DWELLING[b]

Water Supply Fixture Units (WSFUs)	Gallons Per Minute (GPM)
1	1
2	2
3	3
4	4
5	4.5
6	5
7	6
8	6.5
25	7
35	8
40	9

[a] Treatment devices providing treatment for compliance with Table 82.70–1 shall use Table 82.40–2 for conversion.
[b] Table shall not be used for converting hose bibb, high flow fixture or hydrant wsfu.

Table 82.40–2

WATER SUPPLY FIXTURE UNITS FOR PUBLIC USE FIXTURES

Type of Fixture[a]	Water Supply Fixture Units (wsfu)		
	Hot	Cold	Total
Automatic Clothes Washer, Individual	2.0	2.0	3.0
Automatic Clothes Washer, Large Capacity	b	b	b
Autopsy Table	2.0	2.0	3.0
Bathtub, With or Without Shower Head	2.0	2.0	3.0
Coffeemaker		0.5	0.5
Dishwasher, Commercial	b	b	b
Drink Dispenser		0.5	0.5
Drinking Fountain		0.25	0.25
Glass Filler		0.5	0.5
Health Care Fixtures:			
Clinic sink	2.0	7.0	7.0
Exam/treatment sink	0.5	0.5	1.0
Sitz bath	1.5	1.5	2.0
Surgeon washup	1.5	1.5	2.0
Hose Bibb:			
$^1/_2$″ diameter		3.0	3.0
$^3/_4$″ diameter		4.0	4.0
Icemaker		0.5	0.5
Lavatory	0.5	0.5	1.0
Shower, Per Head	2.0	2.0	3.0
Sinks:			
Bar and Fountain	1.5	1.5	2.0
Barber and Shampoo	1.5	1.5	2.0
Cup		0.5	0.5
Flushing Rim		7.0	7.0
Kitchen and Food Preparation per faucet	2.0	2.0	3.0
Laboratory	1.0	1.0	1.5
Service sink	2.0	2.0	3.0
Urinal:			
Syphon Jet		4.0	4.0
Washdown		2.0	2.0
Wall Hydrant, Hot and Cold Mix:			
$^1/_2$″ diameter	2.0	2.0	3.0
$^3/_4$″ diameter	3.0	3.0	4.0
Wash Fountain:			
Semicircular	1.5	1.5	2.0
Circular	2.0	2.0	3.0
Water Closet:			
Flushometer		6.5	6.5
Gravity Type Flush Tank		3.0	3.0

[a] For fixtures not listed, factors may be assumed by comparing the fixture to a listed fixture which uses water in similar quantities and at similar rates.
[b] Load factors in gallons per minute, gpm, based on manufacturer's requirements.

Table 82.40–3

CONVERSION OF WATER SUPPLY FIXTURE UNITS TO GALLONS PER MINUTE

Water Supply Fixture Units	Gallons per Minute	
	Predominately Flushometer Type Water Closets or Syphon Jet Urinals	Predominately Flush Tank Type Water Closets or Washdown Urinals
1	—	1
2	—	2
3	—	3
4	10	4
5	15	4.5
6	18	5
7	21	6
8	24	6.5
9	26	7
10	27	8
20	35	14
30	40	20
40	46	24
50	51	28
60	54	32
70	58	35
80	62	38
90	65	41
100	68	42
120	73	48
140	78	53
160	83	57
180	87	61
200	92	65
250	101	75
300	110	85
400	126	105
500	142	125
600	157	143
700	170	161
800	183	178
900	197	195
1000	208	208
1250	240	240
1500	267	267
1750	294	294
2000	321	321
2250	348	348
2500	375	375
2750	402	402
3000	432	432
4000	525	525
5000	593	593

Note: Values not specified in the table may be calculated by interpolation.