



Water Calculation Worksheet - New Construction

Introduction:

This worksheet uses the empirical method of SPS 382.40(7)(a) to determine the size of the water supply system by taking into account the pressure losses that occur throughout the water supply system and the flow velocities within the water distribution system. **Fill out the fields highlighted in blue to find the "A" value.**

Address:

INFORMATION REQUIRED TO SIZE WATER SERVICE AND WATER DISTRIBUTION:

1	Demand of building in Water Supply Fixture Units (WSFU) [Tables 382.40-1b & 382.40-2]	<input type="text"/>	WSFU
2	Demand of building in WSFU converted to Gallons Per Minute (GPM) [Table SPS 382.40-3]	<input type="text"/>	GPM
3	Elevation difference from main or external pressure tank to building control valve	<input type="text"/>	ft.
4	Size of water meter (when required)	<input type="text"/>	in.
5	Developed length from main or external pressure tank to building control valve	<input type="text"/>	ft.
6	Low pressure at main in street or external pressure tank.	<input type="text"/>	psi

CALCULATE WATER SERVICE PRESSURE LOSS:

**Not required for internal pressure tanks*

7	Low pressure at main in street or external pressure tank.	Value of Line 6:	<input type="text"/>	psi
8	Determine pressure loss due to flow friction in water service	Pipe Size:	<input type="text"/>	in.
		Pressure loss due to friction:	<input type="text"/>	psi/100 ft.
	Water service piping material:	Line 5 divided by 100 (decimal equivalent):	<input type="text"/>	ft.
	<input type="text"/>	Total pressure loss due to friction:	<input type="text"/>	psi
		Subtract Line Above from Line 7:	<input type="text"/>	psi
9	Determine pressure loss or gain due to elevation	(multiply line 3 by .434):	<input type="text"/>	psi
10	Available pressure after the building control valve.	Subtract Line Above from Line 8:	<input type="text"/>	psi
11	Additional pressure from booster pump (when supplied)		<input type="text"/>	psi

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

12	Available pressure after the building control valve.	Add Lines 10 and 11:	<input type="text"/>	psi
13	Pressure loss of water meter (when meter is required)		<input type="text"/>	psi
		Subtract Line Above from Line 12:	<input type="text"/>	psi
14	Pressure at controlling fixture* [SPS 382.40(7)(d)]		<input type="text"/>	psi
		Subtract Line Above from Line 13:	<input type="text"/>	psi

Controlling fixture is:

**Controlling 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.*

15 Difference in elevation between building control valve and the controlling fixture. ft.
 (multiply by .434): psi
 Subtract Line Above from Line 14: psi

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

Pressure loss due to:

- 16.1 WSFU Downstream of Water Treatment Device Line 16.1: WSFU
- 16.2 Convert WSFU to GPM using Table 382.40-3; or Line 16.2: GPM
- 16.3 Convert WSFU to GPM using Table 382.40-3e*; or Line 16.3: GPM
 * For individual dwelling units only
- 16.4 Refer to manufacturer's graph to obtain pressure loss Line 16.4: psi

Note: Enter zero in line 16.4 if no water treatment devices or backflow preventers serve the controlling fixture.

Subtract Line 16.4 from Line 15: psi

17 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 382.40-3]:

Pressure loss (refer to manufacturer's graph to determine loss at the required GPM) psi

Note: Enter zero in the line above if no tankless water heaters, or similar devices, serve the controlling fixture.

Subtract Line Above from Line 16.4: psi

18 Developed length from building control valve to controlling fixture ft
 Multiply by 1.5 ft
 Divide Line 17 by Line Above: psi

Pressure Loss Due to Friction Multiply by 100: **"A" Value:** psi/100'
 of length

Note: "A" Value has been rounded to the next whole number

Water service piping material:
 (Copper, Pex, CPVC, Etc.)

Note: The "A" value obtained by using Table 382.40-3e 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.