

Water Supply and Drainage Fixture Unit Calculation

Project:	Learning Care Group - Everbrook Academy - Parker, CO																
Date:	3/25/2021																
Revised Date:																	
By:	TES Engineering																
	To be filled in.			Auto filled in.													
Fixture	Occupancy	Type	Quantity of Fixtures per Floor						Total Quantity of Fixtures	Water Supply Fixture Units (WSFU)						Drainage Fixture Units (DFU)	
			Bsmt.	1st	2nd	3rd	4th	5th		WSFU (Each)	Total WSFU	Cold WSFU (Each)	Total Cold WSFU	Hot WSFU (Each)	Total Hot WSFU	DFU (Each)	Total DFU
3 - Compartment Sink	Commercial Kitchen	Faucet		1					1	4	4	3	3	3	3	4	4
Combination Oven	Commercial Kitchen	-		2					2	2	4	1.5	3	1.5	3	0	0
Dishwashing Machine	Private	Automatic		2					2	1.4	2.8	0	0	1.4	2.8	2	4
Drinking Fountain	Offices, Etc.	3/8" Valve		1					1	0.25	0.25	0.25	0.25	0	0	0.5	0.5
Frostproof Hose Bibb	-	-		2					2	4	8	4	8	0	0	0	0
Hand Sink	Commercial Kitchen	Faucet		1					1	2	2	1.5	1.5	1.5	1.5	2	2
Lavatory	Private	Faucet		11					11	0.7	7.7	0.5	5.5	0.5	5.5	1	11
Mop Basin	Offices, Etc.	Faucet		1					1	3	3	2.25	2.25	2.25	2.25	2	2
Prep Sink	Commercial Kitchen	Faucet		1					1	2	2	1.5	1.5	1.5	1.5	2	2
Pre-Rinse Unit	Commercial Kitchen	Faucet		1					1	2	2	1.5	1.5	1.5	1.5	0	0
Sink	Public	-		21					21	2	42	1.5	31.5	1.5	31.5	2	42
Washing Machine (8 Lbs.)	Private	Automatic		1					1	1.4	1.4	1	1	1	1	2	2
Water Closet	Private	Flush Tank		17					17	2.2	37.4	2.2	37.4	0	0	4	68
Totals									62		116.55		96.40		53.55		137.50
Cold Water GPM based on WSFU Totals for:		Flush Tank Fixtures									47.22		42.60				
Hot Water GPM based on WSFU Totals for:		Flush Tank Fixtures													30.13		
										2" Water Service 1-1/2" Meter				4" Sanitary Main 1/8" per foot slope			

Darcy-Weisbach Equation

Darcy-Weisbach Formula About Darcy and Weisbach Density of Liquids Design Table

Imperial ▾

Specify Pipe (Click for piping options)

Available Pipes
CPVC ASTM D2846
CPVC ASTM F441
CPVC ASTM F442, SDR 1
Copper Tubing, ASTM B8
PEX Tubing, ASTM F877
PVC Pipe, ASTM D2041

Nominal Size (inch)
1
1.25
1.5
2
2.5
3

Available Option/Schedule
K
L
M

Initial Flowrate: gpm

Calculate Flowrate, Velocity and Friction Loss

Step Size: gpm

Export Data By clicking this you will export data to desktop. Data will be saved in hw.xls

Flow Rate (gpm)	Velocity (ft/sec)	Pressure Loss (psi/100 ft)
47	4.92	1.7965
48	5.03	1.8738
49	5.13	1.9527
50	5.23	2.0332
51	5.34	2.1153
52	5.44	2.1991
53	5.55	2.2845
54	5.65	2.3715
55	5.76	2.4602

Manning

Manning Formula About Robert Manning Manning Friction Factors Design Table

Imperial ▼

Specify Pipe (Click for piping options)

Material

ABS

Cast Iron

Copper

PVC

Steel

Type

DWV Schedule 40

Sewer Grade Pipe SDR 26

Sewer Grade Pipe SDR 35

Sewer Grade Pipe SDR 41

Pitch

0.0625

0.125

0.25

0.375

0.5

Calculate Fl...

Nominal Size (inch)	Inside Diameter (inch)	Full Flow Velocity (ft/s)	Full Flow (gpm)	Half Flow Velocity (ft/s)	Half Flow (gpm)
1.25	1.38	1.4	6.6	1.4	3.3
1.5	1.71	1.6	11.7	1.6	5.85
2	2.17	1.9	22.2	1.9	11.1
3	3.07	2.4	55.9	2.4	27.95
4	4.03	2.9	115.5	2.9	57.75
6	6.07	3.8	344.4	3.8	172.2
8	7.98	4.6	714.4	4.6	357.2
10	10.02	5.3	1310.9	5.3	655.45
12	11.94	6	2092.3	6	1046.15
15	14.55	6.8	3544.6	6.8	1772.3
18	17.7	7.8	5977.7	7.8	2988.85