

“Quick Select” Pressure Booster Design Worksheet

JOB NAME: _____	
CUSTOMER: _____	DATE: _____

Welcome to ITT Bell & Gossett’s “Quick Select” domestic water pressure booster duty point calculation sheet. This process is based on the duty point calculation described in detail in Chapters 1 & 2 of our TEH-1096 Design Manual. This sheet is designed as a “short-cut” for those who already have a basic understanding of Hunter’s Curve and the general concepts of domestic water system design. This work sheet is intended to be a supplement to, not a replacement for TEH-1096. As usual, be sure to consult your local plumbing codes prior to beginning your design work.

Step 1

Calculate the total number of fixture units (FU) in the system using Table I. Fixtures not specifically defined in the chart such as make-up water systems, cooling towers, etc., can be entered as “Other Fixtures”. Remember, the total fixture unit count does not directly define the system GPM requirements.

Table I: Total Fixture Unit Calculation (From ASPE Table 3-5)

Fixture Type	Fixture Units Each	Quantity	Total
Water Closet, Public with Flush Valve	10		
Water Closet, Public with Flush Tank	5		
Pedestal Urinal, Public, 1" Flush Valve	10		
Stall – Wall Urinal, Public, 3/4" Flush Valve	5		
Lavatory, Public	2		
Shower Head, Public, Mixing Valve	4		
Service Sink	3		
Kitchen Sink, Commercial	4		
Water Closet, Private with Flush Valve	6		
Water Closet, Private with Flush Tank	2.2		
Lavatory, Private	0.7		
Bathtub, Private	1.4		
Shower Head, Private	1.4		
Bathroom Group, Private with Flush Valve	8		
Bathroom Group, Private with Flush Tank	3.6		
Kitchen Sink, Private	1.4		
Dishwasher, Private, Automatic	1.4		
Washing Machine, 8 lbs., Private	1.4		
1/2" Hose Bib	4		
3/4" Hose Bib	6		
1" Hose Bib	10		
Other Fixtures			
Other Fixtures			
Other Fixtures			
TOTAL FIXTURE UNITS:			

Step 2

Now the FU total must be converted to actual GPM requirements. Refer to Table II for conversion values. This conversion is based on Natural Bureau of Standards Report BMS79

by R.B. Hunter. This report is often referred to simply as Hunter's Curve.

Table II: FU to GPM Conversion

Total FU	Demand GPM
250	100
500	140
750	175
1000	200
1250	240
1500	275
1750	300
2000	325
2500	390
3000	440
4000	570
5000	665
6000	780
7000	875
8000	960

Step 3

The final step is to calculate the required pressure that the booster system must actually develop. Refer to Table III to perform this calculation.

Table III: Pressure Boost Calculation

1. Static Pressure: <i>Elevation of highest fixture above discharge of booster pump.</i>	_____ ft / 2.31 = _____ PSI
2. Piping Friction Loss Estimation Factor: <i>Estimate friction loss at 10% of critical path piping length in feet.</i>	_____ ft / 2.31 = _____ PSI
3. Static Pressure + Friction Loss:	_____ PSI
4. Pressure Required at Highest Fixture: <i>30 PSI is a typical value but always consult local codes.</i>	_____ PSI
5. Required System Pressure (3+4):	_____ PSI
6. Subtract <i>Minimum</i> Suction Pressure:*	- _____ PSI
7. Required Boost: <i>This is the pressure that the booster system will add on top of the suction pressure.</i>	_____ PSI

*Be sure to account for backflow preventer pressure loss (typically ≈ 30 ft.)

Pressure booster to be designed to deliver _____ GPM @ _____ PSIG boost.



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