North Table Mountain Water and Sanitation District

Industrial/Commercial Water Demand Calculation and Meter Sizing Recommendation

(1/1/2025)

Instructions:

The developer/engineer is responsible for determining demand and selecting the appropriate meter size. The following method is a guideline only. You may use this method or an alternative per AWWA M22, "Sizing Water Service Lines and Meters." Submit all calculations and meter selection criteria to the District for approval. Add any unlisted fixtures to the table and use the manufacturer's data if a fixture's flow rate differs from the provided values.

Fixture Value Worksheet

Fixture	Fixture Value @ 60 psi (GPM) [1]		No. of Fixtures		Fixture Value
Toilet - Tank	3	x		=	
Toilet - Flush Valve	25	x		=	
Urinal	10	x		=	
Bidet	2	x		=	
Shower Head(s)	2	x		=	
Faucet – Bathroom Sink	1.5	x		=	
Faucet – Kitchen Sink	2.2	x		=	
Faucet – Utility Sink	15	x		=	
Dishwasher	1.3	x		=	
Bathtub	5.5	x		=	
Clothes Washer (Residential)	3.5	x		=	
Clothes Washer (Commercial)	12	x		=	
Hose Bib	9	x		=	
Drinking Fountain	1	x		=	
		x		=	
		x		=	
		x		=	
		Combined Fixture Value Total Flow		=	

1 - AWWA M22 4th Ed. Table 4-1- Manufacturer suggested peak flow rates

Customer Peak Demand from Combined Fixture Value Total

Demand *(Attached Fig 4-2: flows <1,200 gpm, Fig 4-3: >1,200 gpm)* = _____ gpm

Pressure Adjustment Factor *(Tbl 4-3)* = _____

Peak Demand Total (Demand x Peak Factor) **=** _____ **gpm**

Irrigation

Number of Sections (100 ft^2 of Irrigated Area = 1 Section) = _____

Factor (Spray Systems = 1.16 or Rotary Systems = 0.4) = _____

Irrigation Total (Number of Sections x Factor) **=** _____ **gpm**

TOTAL FIXED DEMAND (Peak Demand + Irrigation) **=** _____ **gpm**

Reference Table 1 for service line and meter sizing. Use the "Total Fixed Demand" calculated above.

Notes:

1. Tables and Figures below reference AWWA, M22, 2nd and 4th Editions

2. Assumes separate fire line, developer/engineer is responsible to determine fire flow requirements.

3. Tap, service line and meter shall be the same size.

4. The above sizing are estimates based upon the AWWA M22, Sizing Water Service Lines and Meters Manual. The engineer/developer is responsible for determining actual site demands. Consideration shall be given to the entire building/site plumbing system design and in accordance with local plumbing code requirements.

5. A reasonable peak design flow can be used and calculated at 5-8 ft/second (Eq. 5-4 AWWA M22 4th Ed.) The maximum velocity in the water service line is recommended not to exceed 10 ft/sec (Appendix B AWWA M22, 4th Ed.)

6. Fire demand is not included in this method; a separate calculation will be required if there will not be a separate fire line.

Figure 4-2: Water-flow demand per fixture value – Low Range

Use this figure if Combined Fixture Value Flow is less than 1,200 GPM

Refer to AWWA Manual M22 (2nd Edition)

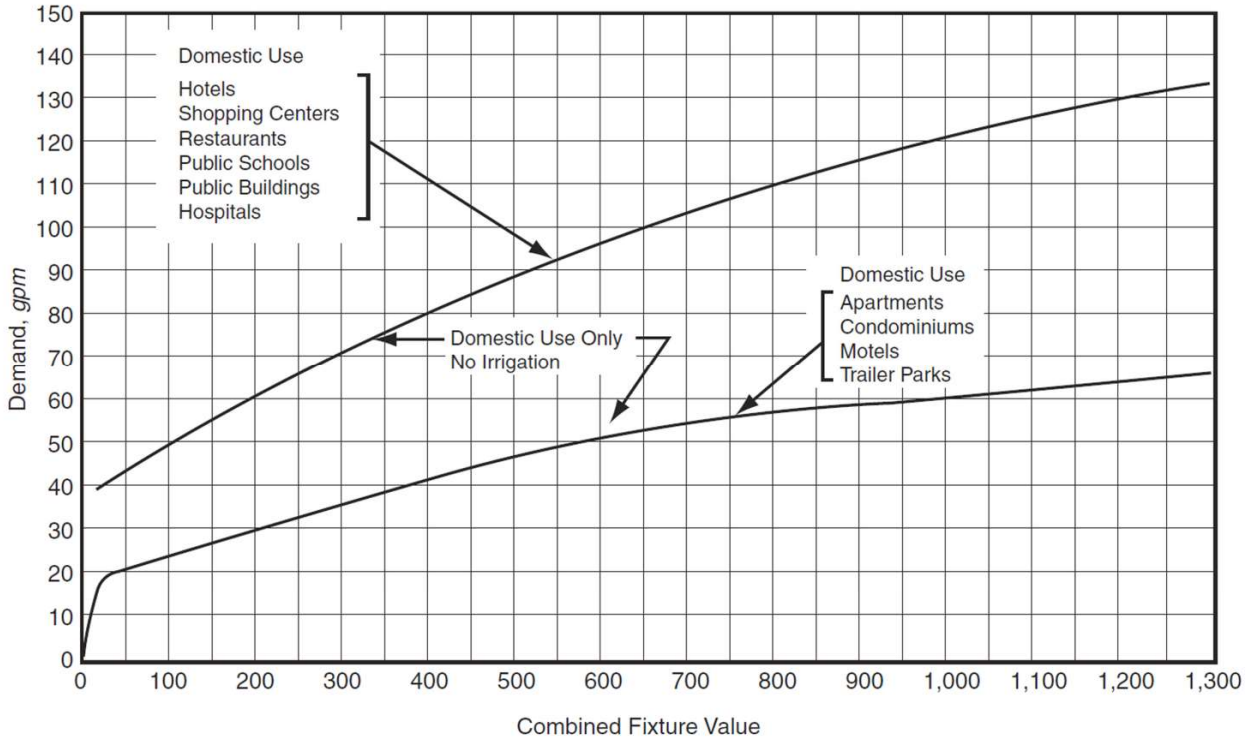
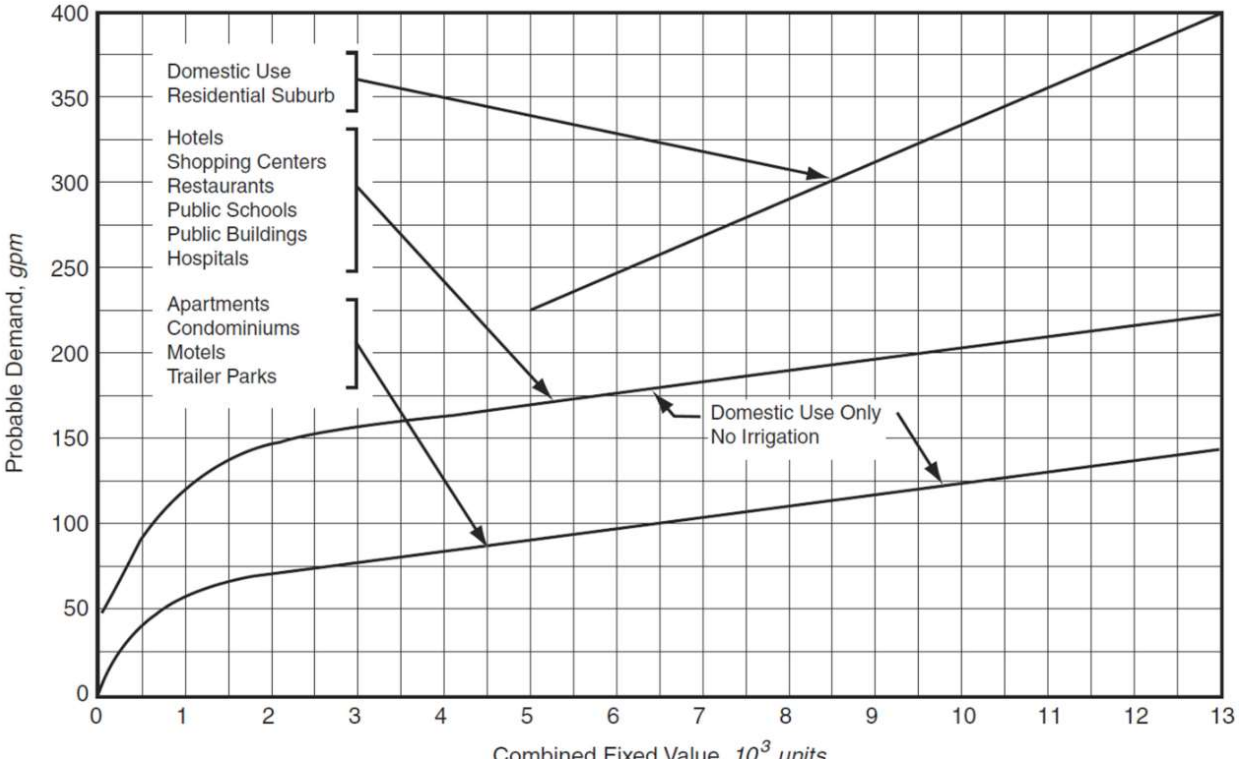


Figure 4-3: Water-flow demand per fixture value – High Range

Use this figure if Combined Fixture Value Flow is greater than or equal to 1,200 GPM

Refer to AWWA Manual M22 (2nd Edition)



Combined Fixed Value, *fu* units

Table 4-1 Pressure adjustment factors*

Working Pressure at Meter Discharge (*psi*)	Average Flow from 50 ft of 5/8-in. Hose and Sprinkler (*gpm*)	Pressure Adjustment Factor
35	6.7	0.74
40	7.2	0.80
50	8.1	0.90
60	9.0	1.00
70	9.8	1.09
80	10.5	1.17
90	11.2	1.25
100	12.1	1.34

*derived from Table 4-1 and 4-2 of Manual M22 (1975).

NOTE: To convert psi to kPa: psi × 6.89476; to convert gpm to m^3/hr: gpm × 0.227.

Table 1
Service Line and Meter Selection

Meter Size (Inches)	Total Fixed Demand (GPM)	Meter Type
3/4"	**0 - 14**	Sonic[1]
1"	**15 -24**	Sonic[1]
1-1/2"	**25 - 55**	Compound[2]
2"	**56 - 95**	Compound[2]
3"	**96 - 210**	Compound[2]
4"	**211 - 365**	Compound[2]

1 - Sensus iPERL

2 - Sensus OMNI C^2

Engineering Assumptions Used In Table 1 Above:

- Available pressure 75 psi (assumed average available pressure in District).
- Required residual pressure after the meter 40 psi
- Hazen-Williams used to calculate copper service line head loss (C=130)
- Design velocity 5 to 8 ft/sec, not to exceed 10 ft/sec
- Length of Service Line = 100 ft