Water Demand from Population and Per Capita Supply

Present and future population by geometric growth, average daily water demand, maximum day and peak hour flows from per capita supply and peak factors.

Method: Geometric growth population forecast; demand = population × per capita supply × peak factors

Input parameters

Unit system: SI

Parameter	Value	Unit
Present population	5,000.0	
Annual growth rate	2.0000	%
Design period (years)	30.000	
Per capita supply (volume per person per day) Per person per day, from your water supply standard for the type of town or colony; choose litres or US gallons.	135.00	L
Maximum day factor	1.8000	
Peak hour factor	2.7000	

Calculated results

Parameter	Value	Unit
Design population $P_0(1 + r)^n$	9,056.8	
Average daily demand	1,222.7	m³/d
Maximum day demand	2,200.8	m³/d
Peak hour flow	38.208	L/s

Formula and method

$$P_n = P_0(1+r)^n, \quad Q_{avg} = \frac{P_n\, q}{1\ \text{day}}, \quad Q_{md} = k_d Q_{avg}, \quad Q_{ph} = k_h Q_{avg}$$

Variables

P_0	Present population	-
r	Annual growth rate	-
n	Design period (years)	-
q	Per capita supply (volume per person per day)	m³
k_d	Maximum day factor	-
k_h	Peak hour factor	-
P_n	Design population $P_0(1 + r)^n$	-
Q_{avg}	Average daily demand	m³/s
Q_{md}	Maximum day demand	m³/s
Q_{ph}	Peak hour flow	m³/s

Method and standards

Geometric growth and per capita demand.

Assumptions and limits

- The per capita supply is a volume per person per day, entered in litres or US gallons (the page converts).
- Steady growth rate.

References

- Geometric growth population forecast; demand = population × per capita supply × peak factors

Report details

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Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/hydraulics/water-demand-population

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.