




Design Flows Technical Standards Section IV




Sewage Flows or Design Flows Section IV (pg. 24)

- What is a design flow?
 - The estimated daily flow expected from a building
 - Measured in gallons per day (GPD)

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Design Flows Section IV (pg. 24)

- A SSDS must be sized to accommodate the flows from a building based on maximum possible occupancy, bedrooms, gross area, seats, metered flows, etc.
- Flows are determined based on building use.

Does everyone have a calculator?

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Design Flows

Section IV (pg. 24)

- Residential Buildings- homes, apartment buildings, condos, townhouses, etc.
 - Single family home-150 GPD per bedroom up to 4 bedrooms, 75 GPD for each bedroom thereafter.
 - Multi-family- 150 GPD per bedroom
 - 50 gallons per person per day times a safety factor of 1.5= 75 GPD per person
 - 75 GPD times two persons per bedroom

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Design Flows

Section IV (pg. 24)

- Nonresidential Buildings and Residential Institutions- schools, restaurants, office, factory, group home, etc.
 - Table No. 4
 - Specific water use data times safety factor of 1.5

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Section IV. Design Flows (pg. 24)

- Nonresidential buildings: Design flows based on metered water usage data and must include a minimum of 1 year of readings. If flows are based on comparison to a similar facility it must be supported by documentation (building size, fixture info, hours of operation, etc.).

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Section IV. Design Flows (pg. 24-25)

- Table No. 4 is not all inclusive
 - Strength and nature of the wastewater must be taken into consideration
 - Strong
 - Medium
 - Weak
 - Reference made to application rates included in Table No. 7 (Restaurants, Residential Institutions, High Strength/Problematic Sewage), and in Table No. 8 (Other nonresidential buildings).
 - Discuss more later

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Design Flows Section IV (pg. 25-26)

- Table No. 4- determining daily design flow
 - Schools, per pupil
 - Commercial/Industrial building per employee
 - Camp
 - Health Care Facilities
 - Restaurants
 - Recreation Facilities
 - Churches
 - Miscellaneous

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Table No. 4

Building Type	Design Flow (GPD)
Schools, per pupil	
Base Flow (Excludes Kitchen & Showers)	
High School	12
Junior High/Middle School	9
Kindergarten/Elementary School	8
Day Care Center	10
Additional Flows for Kitchen & Showers	
Kitchen (Table No. 7 Applic. Rate)	3
Showers	3
Residential	100

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Table No. 4

Commercial Buildings**

Office (Average 200 sq. ft. gross area/person), per employee	20
Retail/Supermarket Building*, per sq. ft. gross area	0.1
*Supermarkets must increase design flow to account for delis and bakeries	
Deli and bakery flow: (Table No. 7 Applic. Rate)	
Industrial Building, per sq. ft. of gross area	0.1
Factory (Average 200 sq. ft. gross area/person), per employee	25
(Add 10 GPD for showers)	
**Design flows may be reduced if documentation (building/floor plans, statement of use, etc.) supports the reduction	

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Section IV Design Flows pg. 24-25 Subsection B, Table 4

- Commercial building category
 - Design flows may be reduced if documentation (building/floor plans, statement of use, etc.) supports reduction.
 - Industrial building design flow (0.1 GPD/SF of gross floor area) added
 - Factory design flow stipulates that the # of persons is based on 1 person per 200 square feet of floor area.

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Table No. 4

Camps/Family Campgrounds

Residential Camp (Semi permanent), per person	50
Campground with Central Sanitary Facilities, per person	35
Campground per Camp Space (Water and sewer hook-ups)	75
Day Camp, per person	15
Picnic Park (Toilet wastes only), per person	5
Picnic Park with Bathhouses, Showers, Flush Toilets, per person	10

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Table No. 4

Residential Institutions (Table No. 7 Applic. Rate)

Hospital, per bed	250
Rest Home, per bed	150
Convalescent Home, per bed	150
Institution, per resident	100
Residential motels/hotels, per room	150
Group Home/Community Living Arrangement, per client*	100-150**

*Use maximum occupancy unless state license restricts occupancy & requires local health department approval in accordance with PHC Section 19-13-B100a for occupancy increases
 **Use higher flow for large tub/on-site laundry

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Table No. 4

Restaurants, Food Service Establishments and Bars (Table No. 7 Applic. Rate)

Restaurant (Public toilets provided), per seat	30*
Restaurant (No public toilets), per seat	20*
*Design flow shall be increased by 50% if breakfast, lunch & dinner are provided	
Take-out Food Service, per meal served	5
Bar/Cocktail Lounge (No meals), per seat (Table No. 8 Applic. Rate)	15

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Table No. 4

Recreational Facilities

Swimming pool, per bather	10
Tennis Court, per court, indoor/outdoor	400/150
Theater, Sport Complex, per seat	3.5

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Calculations

$$9 + 3 = 12 \text{ GPD per student}$$

$$200 \times 12 = 2,400 \text{ GPD}$$



Calculations

10,000 SF Office Building

Commercial Buildings**

Office (Average 200 sq. ft. gross area/person), per employee	20
Retail Supermarket Building*, per sq. ft. gross area	0.1
*Supermarkets must increase design flow to account for delis and bakeries	
Deli and bakery flow: (Table No. 7 Applic. Rate)	
Industrial Building, per sq. ft. of gross area	0.1
Factory (Average 200 sq. ft. gross area/person), per employee	25
(Add 10 GPD for showers)	
**Design flows may be reduced if documentation (building floor plans, statement of use, etc.) supports the reduction	



Calculations

■ 10,000 Square Feet (SF) Office Building

- 10,000 SF/200 per employee = 50 employees

$$50 \text{ (employees)} \times 20 \text{ GPD} = 1,000 \text{ GPD}$$



Calculations

10,000 SF Commercial/Retail

Commercial Buildings**

Office (Average 200 sq. ft. gross area/person), per employee	30
Retail/Supermarket Building*, per sq. ft. gross area	0.1
*Supermarkets must increase design flow to account for delis and bakeries	
Deli and bakery flow: (Table No. 7 Applic. Rate)	
Industrial Building, per sq. ft. of gross area	0.1
Factory (Average 200 sq. ft. gross area/person), per employee	25
(Add 10 GPD for showers)	

**Design flows may be reduced if documentation (building/floor plans, statement of use, etc.) supports the reduction

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Calculations

10,000 SF Retail/Commercial

$$10,000 \text{ SF} \times 0.1 \text{ GPD/SF} = 1,000 \text{ GPD}$$

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Calculations

100 Seat restaurant serving lunch and dinner w/ toilets.

Restaurants, Food Service Establishments and Bars (Table No. 7 Applic. Rate)

Restaurant (Public toilets provided), per seat	30*
Restaurant (No public toilets), per seat	20*
*Design flow shall be increased by 50% if breakfast, lunch & dinner are provided	
Take-out Food Service, per meal served	5
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Calculations

100 Seat restaurant (Class 3) serving lunch and dinner w/ toilets.

$$100 \text{ (seats)} \times 30 \text{ (GPD per seat)} = 3,000 \text{ GPD}$$



Calculations

- Specific water use data
 - One year minimum metered flows times 1.5 safety factor
 - Non-residential buildings and Residential Institutions



Calculations

- 5 area McD's Restaurants approximately the same size, number of seats, and hours of operation.
 - Average Flows:
 - 2,250 GPD
 - 2,600 GPD
 - 1,955 GPD
 - 1,800 GPD
 - 2,475 GPD



Calculations

2,250 GPD
2,600 GPD
1,955 GPD
1,800 GPD
+ 2,475 GPD

11,080/5 = 2,216

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Calculations

- Average Daily Flow = 2,216 GPD

2,216 x 1.5 (safety factor) = 3,324

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Design Flows (pg. 26)

- Water usage monitoring: Large systems (2000 GPD or greater) must have the ability to monitor potable water supply usage
- Permits to discharge: Must be approved forms. Form #4 or approved equal. Permits shall reference design flow, permitted flow and recommend the average flow not exceed 2/3 of the design flow.

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