

* Design Flows Technical Standards Section IV

Connecticut Department of Public Health
Keeping Connecticut Healthy

* Design Flows Section IV (pgs. 22 & 23)

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

* Design Flows Section IV

- * A subsurface sewage disposal system 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?

* Design Flows Section IV

- * Residential Buildings- homes, apartment buildings, condos, townhouses, etc.
 - * Single family home-150 GPD per bedroom up to 3 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 =150 GPD / bedroom



* Design Flows Section IV

- * Nonresidential Buildings and Residential Institutions - school, restaurant, office, factory, group home, etc.
 - * Table 4 (not all inclusive)
 - * Average metered water use data times a 1.5 factor of safety (minimum of 1 year of data or season of operation and be based on a comparison to a similar facility)

DPH * **Section IV Design Flows**

*Strength and nature of the wastewater must be taken into consideration

- *Strong
- *Medium
- *Weak

Table No. 7
(Restaurants, Residential Institutions, High Strength/Problematic Sewage)

Table No. 8
(Other nonresidential buildings, Non-problematic sewage)

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DPH * **Design Flows Section IV**

*Table 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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DPH * **Table 4 (pgs. 22-23)**

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 Floors for Kitchen & Showers	
Kitchens (Table 7 Ap. Rate)	3
Showers	3
Residential	100
Commercial Buildings**	
Office (Average 200 sq. ft. gross area/person), per employee	20
Retail "Supermarket Building", per sq. ft. gross area	0.1
**Supermarkets shall increase design flow to account for delis and bakeries	
Delis and bakery flow (Table 7 Ap. Rate)	
Industrial Building, per sq. ft. of gross area	0.1
Factory (Average 200 sq. ft. gross area/person), per employee (Add 10 GPD for showers)	25
**Design flows may be reduced if documentation (building floor plans, statement of use, etc.) supports the reduction	

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DPH * **Table 4 (pgs. 22-23)**

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
Residential Institution (Table 7 Ap. Rate)	
Hospital, per bed	250
Rest Home, per bed	150
Convalescent Home, per bed	150
Institution, per resident	100
Residential models hotels, per room	150
Group Home/Consumatory 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	
Restaurants, Food Service Establishments and Bars (Table 7 Ap. 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 8 Ap. Rate)	15

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DPH * **Table 4 (pgs. 22-23)**

Miscellaneous	
Auto Service Station, per car serviced	5
Salon, (Table 7 App. Rate)	
Per styling chair/station (hair)	200
Per pedicure chair/spa (5 gallon maximum basin)	100
Per manicure chair/station	50
Barber Shop, per chair	50
Dental/Medical Office with Examination Rooms, per SF of gross area	0.2
Dog Kennel, per run (Roof shall be provided) (Table 7 App. Rate)	25
Pet Grooming, per station (Table 7 App. Rate)	250
Laundromat (Non-DEEP Regulated), per machine (Table 7 App. Rate)	400
Motel (Transient, No Food Service, Kitchenette or Laundry Facilities), per room	75
Motel (Transient, With Kitchenette but no Laundry Facilities), per room	100
Marina (Bath-house & Showers Provided), per boat slip	20

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DPH * **Section IV Design Flows 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)
- *Factory design flow stipulates that the number of persons is based on 1 person per 200 square feet of floor area unless actual number of employees is known or provided

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DPH * **Design Flows Section IV**

*Example calculations using Table 4
 *200 student middle school with showers, no kitchen

Building Type	Design Flow (GPD)
Schools, per pupil	
Base Flow (Includes Kitchen & Showers)	
High School	9
Junior High/Middle School	3
Kindergarten/Elementary School	10
Day Care Center	10
Additional Flows for Kitchens & Showers	
Kitchen (Table 7 Ap. Rate)	
Showers	3
Residential	100
Commercial Buildings**	
Office (Average 200 sq. ft. gross area/person), per employee	20
Retail/Supermarket Building*, per sq. ft. gross area	0.1
*Supermarkets shall increase design flow to account for delis and bakeries	
Deli and bakery flow: (Table 7 Ap. 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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DPH * **Calculations**

$9 + 3 = 12$ GPD per student

$200 \times 12 = 2,400$ GPD

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DPH * **Calculations**

10,000 Square Foot (Sq. Ft.) 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 shall increase design flow to account for delis and bakeries	
Deli and bakery flow: (Table 7 Ap. 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	

$10,000 / 200$ per employee = 50 employees

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

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DPH * **Calculations**

10,000 Square Foot Commercial/Retail 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 shall increase design flow to account for delis and bakeries	
Deli and bakery flow: (Table 7 Ap. 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	

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

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DPH * **Calculations**

100 Seat restaurant serving lunch and dinner w/ toilets

Restaurants, Food Service Establishments and Bars (Table 7 Ap. 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 8 Ap. Rate)	15

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

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DPH * **Calculations**

- * Specific water use data
- * One year minimum metered flows (or season of operation) times 1.5 safety factor
- * Non-residential buildings and Residential Institutions

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DPH * **Calculations**

*5 area McD's Restaurants approximately the same size, number of seats, and hours of operation

*Average daily flows:

- *2,250 GPD
- *2,600 GPD
- *1,955 GPD
- *1,800 GPD
- *2,475 GPD

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DPH * **Calculations**



2,250 GPD	
2,600 GPD	
1,955 GPD	
1,800 GPD	
+ 2,475 GPD	
11,080 / 5 = 2,216	

2216 x 1.5 (factor of safety) = 3,324

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DPH * **Design Flows (pgs. 22 & 23)**

*Water Usage Monitoring: Large system (>2,000 GPD) plans shall include provisions to monitor domestic sewage generation via the use of water meters or other available means (i.e., pump cycling and dose volume documentation)

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DPH * **Design Flows (pgs. 22 & 23)**

- *Permits to Discharge: Must be approved on 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
- *Management Programs: proposed ordinances and regulations shall be submitted to DPH for review prior to adoption

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