

the number of users for designing and waste water amount ( Japan )

	Purpose of building use	number of users for designing		waste water		
		calculation formula	remarks	volume a unit	BOD (mg/L)	volume a person (L/day·person)
1	public hall meeting place theatre movie house entertainment hall religious hall	$n = 0.08 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	16 (L/ $m^2$ ·day)	150	200
	bicycle race truck race course motor boat race place	$n = 16 \cdot C$	n: nubmer of users for design C: total stool number(No.)	2,400 (L/No.·day)	260	150
	viewing stand gymnasium	$n = 0.065 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	10 (L/ $m^2$ ·day)	260	155
2	residence( $A \leq 130$ )	$n = 5$	n: nubmer of users for design A: total floor area ( $m^2$ )	1,000 (L/residence·day)	200	200
	residence( $A > 130$ )	$n = 7$	n: nubmer of users for design A: total floor area ( $m^2$ )	1,400 (L/residence·day)		
	multiple dwelling house	$n = 0.05 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ ) Note that when "n" is up to 3.5 persons per house, the "n" per house is reckoned as 3.5 persons ( or 2 persons when the house consits of one room ) when "n" per house exceeds 6 persons, the "n" per house is reckoned as 6 persons.	10 (L/ $m^2$ ·day)	200	200
	lodging house dormitory	$n = 0.07 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	14 (L/ $m^2$ ·day)	140	200
	school dormitory self defence force camp old-age home protective institution	$n = P$	n: nubmer of users for design P: capacity ( person )	200 (L/day·person)	200	200
3	hotel with wedding or banquet hall	$n = 0.15 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	30 (L/ $m^2$ ·day)	200	200
	hotel with no wedding or banquet hall	$n = 0.075 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	30 (L/ $m^2$ ·day)	100	400
	motel	$n = 5 \cdot R$	n: nubmer of users for design R: number of room ( No. )	1,000 (L/day·No.)	50	200
	flop house training house youth camp	$n = P$	n: nubmer of users for design P: capacity ( person )	200 (L/day·person)	200	200
4	hospital with kitchen or laundry					
	bed No. < 300	$n = 8 \cdot B$	n: nubmer of users for design B: number of bed ( No. )	B·1,000 (L/day·No.)	320	123
	bed No. $\geq 300$	$n = 11.43(B-300) + 2,400$	n: nubmer of users for design B: number of bed ( No. )	B·1,300 (L/day·No.)	320	113
	hospital with no kitchen or no laundry					
	bed No. < 300	$n = 5 \cdot B$	n: nubmer of users for design B: number of bed ( No. )	B·1,000 (L/day·No.)	150	200
	bed No. $\geq 300$	$n = 7.14(B-300) + 1,500$	n: nubmer of users for design B: number of bed ( No. )	B·1,300 (L/day·No.)	150	182
clinic	$n = 0.19 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	25 (L/ $m^2$ ·day)	300	130	
5	store	$n = 0.075 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	15 (L/ $m^2$ ·day)	150	200
	department store	$n = 0.15 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	30 (L/ $m^2$ ·day)	150	200
	restaurant					
	general	$n = 0.72 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	130 (L/ $m^2$ ·day)	220	180
	high pollutant discharge(*1)	$n = 2.94 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	260 (L/ $m^2$ ·day)	450	90
	low pollutant discharge(*2)	$n = 0.55 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	110 (L/ $m^2$ ·day)	200	200
	café	$n = 0.80 \cdot A$	n: nubmer of users for design A: total floor area ( $m^2$ )	160 (L/ $m^2$ ·day)	150	200

(\*1) restaurant high pollutant discharge is chinese,french, first foods etc.

(\*2) restaurant low pollutant discharge is sushi, noodle, spaghetti foods etc.

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6	billiard room	$n = 0.075 \cdot A$	n: nubmer of users for design	15	150	200
	table tennis room		A: total floor area ( $m^2$ )	(L/ $m^2$ ·day)		
	pinball parlor	$n = 0.11 \cdot A$	n: nubmer of users for design	22	150	200
			A: total floor area ( $m^2$ )	(L/ $m^2$ ·day)		
	club of "go" or "mahjong" game	$n = 0.15 \cdot A$	n: nubmer of users for design	30	150	200
			A: total floor area ( $m^2$ )	(L/ $m^2$ ·day)		
	disco hall	$n = 0.50 \cdot A$	n: nubmer of users for design	100	150	200
			A: total floor area ( $m^2$ )	(L/ $m^2$ ·day)		
	training place of golf	$n = 0.25 \cdot S$	n: nubmer of users for design	50	150	200
			S: number of box ( No. )	(L/day·No.)		
	bowling alleys	$n = 2.50 \cdot L$	n: nubmer of users for design	500	150	200
			L: number of lane ( No. )	(L/day·No.)		
	batting alleys of baseball	$n = 0.20 \cdot S$	n: nubmer of users for design	40	150	200
			S: number of box ( No. )	(L/day·No.)		
tennis court with no lighting	$n = 2 \cdot S$	n: nubmer of users for design	400	150	200	
		S: number of court ( No. )	(L/day·No.)			
tennis court with lighting	$n = 3 \cdot S$	n: nubmer of users for design	600	150	200	
		S: number of court ( No. )	(L/day·No.)			
public preasure ground outside bathing place	$n = 16 \cdot C$	n: nubmer of users for design	2,400	260	150	
		C: total stool number(No.)	(L/No.·day)			
pool	$n = \frac{(20 \cdot C + 120 \cdot U)}{8} \cdot t$	n: nubmer of users for design	—————	150	—————	
skate rink		C: total stool number(No.) (feces) U: total stool number(No.) (urine) t: average using time ( hour/one stool·day ) t = 1~2				
camping ground	$n = 0.56 \cdot P$	n: nubmer of users for design	70	320	125	
		P: capacity ( person )	(L/day·person)			
golf link	$n = 21 \cdot H$	n: nubmer of users for design	250	130	250	
		H: number of hole (No.)	(L/day·person)			
7	service area(highway) drive-in (lavatory)					
	genaral	$n = 3.60 \cdot P$	n: nubmer of users for design	480	300	135
	sightseeing	$n = 3.83 \cdot P$	P: number of parking box ( No. )	510		
	no shop	$n = 2.55 \cdot P$		340		
	(shop) genaral	$n = 2.66 \cdot P$		180	590	115
	sightseeing	$n = 2.81 \cdot P$		190		
	parking place garage	$n = \frac{(20 \cdot C + 120 \cdot U)}{8} \cdot t$	n: nubmer of users for design	—————	—————	—————
		C: total stool number(No.) (feces) U: total stool number(No.) (urine) t: average using time ( hour/one stool·day ) t = 0.4~2.0				
gasoline station service station	$n = 20$ per one station	n: nubmer of users for design	—————	—————	—————	
8	day nursery	$n = 0.20 \cdot P$	n: nubmer of users for design	50	180	200
	kinder garten		P: capacity ( person )	(L/day·person)		
	elementary school					
	junior high school					
high school	$n = 0.25 \cdot P$	n: nubmer of users for design	60	180	200	
university		P: capacity ( person )	(L/day·person)			
various school						
library	$n = 0.08 \cdot A$	n: nubmer of users for design	16	150	200	
		A: total floor area ( $m^2$ )	(L/ $m^2$ ·day)			
9	office with kitchen for business use	$n = 0.075 \cdot A$	n: nubmer of users for design	15	200	200
			A: total floor area ( $m^2$ )	(L/ $m^2$ ·day)		
	office with no kitchen for business use	$n = 0.06 \cdot A$		15	200	200
				(L/ $m^2$ ·day)		

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		calculation formula	remarks	volume a unit	BOD (mg/L)	volume a person (L/day·person)
10	factory laboratory					
	with kitchen for business use	$n = 0.75 \cdot P$	n: nubmer of users for design P: capacity ( person )	100 (L/day·person)	300	133
	with no kitchen for business use	$n = 0.30 \cdot P$		60 (L/day·person)	150	200
11	market	$n = 0.02 \cdot A$	n: nubmer of users for design A: total floor area ( m <sup>2</sup> )	4.2 (L/m <sup>2</sup> ·day)	200	200
	public bathhouse	$n = 0.17 \cdot A$	n: nubmer of users for design A: total floor area ( m <sup>2</sup> )	33 (L/m <sup>2</sup> ·day)	50	200
	public lavatory	$n = 16 \cdot C$	n: nubmer of users for design C: total stool number(No.)	—	—	—
	station bus terminal	$P < 100,000$ $n = 0.008 \cdot P$ $100,000 \leq P < 200,000$ $n = 0.010 \cdot P$ $200,000 \leq P$ $n = 0.013 \cdot P$	n: nubmer of users for design P: passenger (men/day )	—	—	—

**the comparison of Estimated Waste/Sewage Flow Rates**

Revised National Plumbing Code of the Philippines				Japan ( contrastive )	
	type of occupancy	waste/sewage flow rate	BOD (mg/L)	waste a unit	BOD (mg/L)
1	Airports	56.8 (L/day•employee)	?	_____	
		18.9 (L/day•passenger)			
2	Auto washers ( check with manufacturer )				
3	Bowling alleys ( snack bar only )	289.3 (L/day•lane)	?	500 (L/day•lane)	150
4	Camps				
	campground with central comfort station with flush toilets, no showers	132.5 (L/day•person)	?	70 (L/day•person)	320
	day camps ( no meals served )	94.6 (L/day•person)	?		
	summer and seasonal	56.8 (L/day•person)	?		
	189.3 (L/day•person)	?			
5	Churches ( Sanctuary )	18.9 (L/day•seat)	?	entertainment hall 16 (L/day•m <sup>2</sup> )	150
	with kitchen waste	26.5 (L/day•seat)	?		
6	Dance hall	18.9 (L/day•person)	?	Disco hall 100 (L/day•m <sup>2</sup> )	150
7	Factories			60 (L/day•employee)	150
	no showers	94.6 (L/day•employee)	?		
	with showers	132.5 (L/day•employee)	?		
	cafeteria,add	18.9 (L/day•employee)	?	100 (L/day•employee)	300
8	Hospitals	946.3 (L/day•bed)	?	with kitchen or laundry bed•(1,000~1,300) (L/day•bed)	320
	kitchen waste only	94.6 (L/day•employee)	?		
	laundry waste only	151.4 (L/day•employee)	?		
9	Hotels no kitchen waste	227.1 (L/day•bed) ( per 2 person )	?	30 (L/day•m <sup>2</sup> )	100
10	Institutions(Residents)	289.3 (L/day•person)	?	protective institutions 200 (L/day•person)	200
	nursing home	473.1 (L/day•person)	?		
	rest home	473.1 (L/day•person)	?		
11	Laundries,self service			- -----	
	(minimum 10 hours per day)	189.3 (L/day•wash cycle)	?		
	commercial ( chech manufacterer)				
12	Motel	189.3 (L/day•bed)	?	1,000 (L/day•room)	50
	with kitchen	227.1 (L/day•bed)	?		
13	Offices	75.7 (L/day•employee)	?	15 (L/day•m <sup>2</sup> )	200
14	Parks,mobile homes	946.3 (L/day•space)	?	- -----	
	picnic parks ( toilets only )	75.7 (L/day•space)	?		
	recreation vehicles-without hook-up	278.5 (L/day•space)	?		
	recreation vehicles-with water and shower hook-up	378.5 (L/day•space)	?		
15	Restaurants-cafeterias	75.7 (L/day•employee)	?	general 130 (L/day•m <sup>2</sup> )	220
	toilet	26.5 (L/day•customer)	?		
	kitchen waste	22.7 (L/day•meal)	?	with high pollutant discharge 260 (L/day•m <sup>2</sup> )	450
	add for garbage disposal	3.8 (L/day•meal)	?		
	add for cocktail lounge	7.6 (L/day•customer)	?	with lowpollutant discharge 110 (L/day•m <sup>2</sup> )	200
	kitchen waste disposal service	7.6 (L/day•meal)	?		
16	Schools			50~60 (L/day•person)	180
	staff and office	75.7 (L/day•person)	?		
	elementary students	56.8 (L/day•person)	?		
	intermedia and high	75.7 (L/day•student)	?		
	with gym and showers,add	18.9 (L/day•student)	?		
	with cafeteria,add	11.4 (L/day•student)	?		
boarding,total waste	378.5 (L/day•person)	?			
17	Service station,toilets 1892.5 for each additional station bay	3,785 (L/day•station)	?	- -----	
18	Stores	75.7 (L/day•employee)	?	15~30 (L/day•m <sup>2</sup> )	150
	public restroom,add	4 (L/day•m <sup>2</sup> )			
19					
20	Swimming pools,public	37.9 (L/day•person)	?	-	150
	Theaters,auditoriums	18.9 (L/day•seat)	?	16 (L/day•m <sup>2</sup> )	150
	drive-in	37.9 (L/day•m <sup>2</sup> )	?	180 (L/day•box)	590

**Natural Master Plumbers Association of the Philippines.Inc.**