



City of Oceanside
Building Division
300 N Coast Hwy
Oceanside CA 92054
Ph 760-435-3950
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Residential Sewage Ejection System for One Lot/Single Family Dwelling

The installation of a sewer ejection system must comply with the 2007 California Plumbing Code (see Article 710). Wherever practicable, ALL plumbing fixtures shall be drained to the public sewer or private sewage disposal system by gravity.

- 1) Provide three (3) sets of plans and specifications for the sewer ejection system to be installed. Include:
 - A. Manufacturer's installation instructions
 - B. Listings and cut sheet information
 - C. Show setback to property line
 - D. Location/elevation of pump/elevation at the point of connection to gravity drain.
 - E. Location of any required clean out(s).
- 2) Provide details relative to fittings to be used in discharge pipe and type of discharge pipe. Include:
 - A. Type and size of discharge pipe
 - B. Show details of the point of connection to the gravity drainage line
 - C. Show point of connection to the sump/tank, top or side
 - D. Material/specifications for backwater and gate valves
- 3) Show backfill material and masonry pit or other approved enclosure.
- 4) Provide complete details relative to venting.
- 5) Provide location of pump controller, source of power, wiring method used to provide power to the controller and the method of running cable from the pump to the controller.
- 6) Building drains or building sewers receiving discharge from any pump or ejector shall be adequately sized to prevent overloading. Two (2) fixture units shall be allowed for each gallon per minute flow.
 - A. Provide pump-sizing calculations
 - B. Provide the total amount of fixture units
 - C. Provide the system capacity based on fixture units served and the total dynamic head pressure (total dynamic head in feet is the total resistance in piping network, which one is pumping against). The pump must be capable of pumping to the highest vertical point in the system. Pumps receiving the discharge from water closets or urinals shall have a pump discharge capacity of not less than 20 gallons per minute.
 - D. Complete City of Oceanside Sewage System Sizing and Selection Worksheet, or if applicable the Grinder Pump Sizing and Selection Worksheet.
- 7) Provide details of the exact location of the installation on the property in relationship to the building. Note: Location of receptor and containment must be a sufficient distance from the building foundation to avoid any surcharge or designed to withstand such surcharge.



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SEWAGE SYSTEM SIZING AND SELECTION WORKSHEET

<p style="text-align: center;">CONTROLS</p> <p>AUTOMATIC _____</p> <p>NONAUTO _____</p> <p>N-PAK _____</p> <p>E-PAK _____</p> <p>ALARM _____</p> <p>SINGLE FLT. SW. _____</p> <p>DOUBLE FLT. SW. _____</p> <p>OTHER _____</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">PIPE MAT'L _____</td> <td>SIZE _____</td> </tr> <tr> <th>FITTINGS</th> <th>QTY.</th> <th>SIZE</th> </tr> <tr> <td>CHECK VALVE</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>90° ELBOW</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>45° ELBOW</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>GATE VALVE</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>TEE</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>OTHER</td> <td>_____</td> <td>_____</td> </tr> </table>	PIPE MAT'L _____		SIZE _____	FITTINGS	QTY.	SIZE	CHECK VALVE	_____	_____	90° ELBOW	_____	_____	45° ELBOW	_____	_____	GATE VALVE	_____	_____	TEE	_____	_____	OTHER	_____	_____	<p style="text-align: center;">LOCATION:</p> <p>INDOOR _____</p> <p>OUTDOOR _____</p>
PIPE MAT'L _____		SIZE _____																								
FITTINGS	QTY.	SIZE																								
CHECK VALVE	_____	_____																								
90° ELBOW	_____	_____																								
45° ELBOW	_____	_____																								
GATE VALVE	_____	_____																								
TEE	_____	_____																								
OTHER	_____	_____																								

COVER

SIMPLEX _____ DUPLEX _____

VENT SIZE _____

DISCHARGE SIZE _____

INSPECTION PLATE _____

TOTAL PIPE LENGTH _____ FT.

SEWER PRESSURE _____ P.S.I.

PUMP MODEL _____

VOLTAGE _____

PHASE _____

CAST IRON _____

PLASTIC _____

BRASS _____

CORD LG. _____ FT.

OTHER _____

CHECK VALVE _____ IN.

HUB SIZE 4" STD.

LOCATE HUB(S) _____ IN.

G.P.M. N _____

-OR- F.U. _____

TOTAL STATIC HEAD _____ FT.

BASIN DIA. _____ IN.

BASIN DEPTH _____ IN.

SEWAGE SYSTEM SIZING AND PUMP SELECTION WORKSHEET

To begin, fill in the shaded areas on the front side. A calculator and additional sheet of paper may be required.

- STEP #1** Determine the type and quantity of each plumbing fixture. Multiply each by its fixture unit values in Figure "A", Sum these values _____ Determine GPM from Figure "B". _____ GPM (1)
- STEP #2** Refer to Figure "C". Based on the System's discharge piping size, determine the minimum GPM listed for that size. _____ GPM (2)
- STEP #3** Select the greater of the two GPM values in #1 & #2. This is your Design GPM. If greater than maximum GPM listed in figure, "B", contact factory. _____ GPM (3)
- STEP #4** Multiply each pipe fitting by its equivalent length value shown in figure "D" and sum. _____ Ft. (4)
- STEP #5** Total pipe length from front side. _____ Ft. (5)
- STEP #6** Add #4 & #5 [(4)+(5)=(6)] _____ Ft. (6)
- STEP #7** Divide #6 by 100 and multiply it by the associated friction value from Figure "E". This is the total Friction Head. _____ Ft. (7)
- STEP #8** Determine static head in Ft., as shown on front side, from minimum water level to the discharge point. _____ Ft. (8)
- STEP #9** Sewer Pressure, if any, expressed in feet (PSI x 2.31). _____ Ft. (9)
- STEP #10** Add #7, #8, #9, [(7)+(8)+(9)=(10)]. This is the system's Total Dynamic Head (TDH). _____ Ft. (10)
- STEP #11** Select the Pump:
Determine solids handling requirement (2" and above)
Select pump from curves shown on FM0269 & FM0995.
Base selection on design values **#3 & #10**
Required voltage source _____ (Model No.)
_____ (Volts/Phase)
- STEP #12** Select type of contro:
 Simplex Duplex
If simplex:
 Mechanical switch Single float switch
 Dual float switch Alarm
If duplex:
 Mechanical Alternator Electrical Alternator
- STEP #13** Select Basin Size:
Refer to Figure "F" and FM 0541 _____ in X _____ in
(diam.) (Depth)
- STEP #14** Select Basin Cover:
 One Pump Dual Pump
Vent Pipe Size _____ in.
Discharge Pipe Size _____ in.

- Final Notes:
1) Consult Factory in any application where TDH is less than 5 **#10**.
2) Pump must be capable of providing the minimum required GPM for pipe size, Figure "C", at the calculated TDH **#10**.
3) Pump's lock valve must be greater than system's highest point.

FIGURE A PLUMBING FIXTURE UNIT VALUES*			
Fixture Description	Fixture Unit Valve	Fixture Description	Fixture Unit Valve
Bathtub, 1-1/2" trap	2	Sink, service type	3
Bathtub, 2" trap	3	Sink, scultery	4
Bidet, 1-1/2" trap	3	Sink, surgeons	3
Dental unit or cuspidor	1	Swimming pool (per 100 gallons)	1
Drinking fountain	1	Urinal	4****
Dshwasher, domestic	2	Washing machine	2
Kitchen sink	2	Water closet	3****
Kitchen sink with disposal	3	Water softener	4
Lavatory, 1-1/2" trap	1	Unlisted fixture, 1-1/4" trap	2
Lavatory, barbar/beautician	2	Unlisted fixture, 1-1/2" trap	3
Laundry tray	2	Unlisted fixture, 2" trap	4
Shower	2	Unlisted fixture, 2-1/2" trap	5
Shower, group (per head)	3	Unlisted fixture, 3" trap	6
Bathroom group consisting of lavatory, bathtub or shower and water closet			6****

Graph data is taken from ASPE Handbook, Uniform Plumbing Code, Cameron Hydraulic Data and Platic Pipe Institute.
**Add 4 fixture units for each flush valve fixture

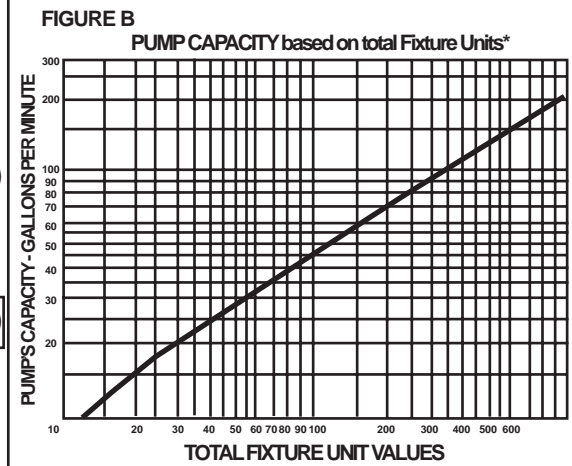


FIGURE C*

Pipe Size	Minimum GPM
2"	21
2 1/2"	30
3"	46
4"	78

FIGURE D*
Friction factors for pipe fittings in terms of equivalent feet of straight pipe

Nominal Pipe Size	90 Elbow	45 Elbow	Tee (Thru-flow)	Tee Branch flow	Swing Check Valve	Gate Valve
2"	5.2	2.8	3.5	10.3	17.2	1.4
2 1/2"	6.2	3.3	4.1	12.3	20.6	1.7
3"	7.7	4.1	5.1	15.3	25.5	2.0
4"	10.0	5.0	7.0	22.0	33.0	2.3

FIGURE E*
FRICTION HEAD IN FEET PER 100 OF SCHEDULE 40 PIPE

GPM	2"		2 1/2"		3"		4"	
	Plastic	Steel	Plastic	Steel	Plastic	Steel	Plastic	Steel
20	0.73	1.55	0.31	0.65				
25	1.10	2.34	0.47	0.99				
30	1.55	3.28	0.65	1.38				
35	2.06	4.37	0.87	1.84	0.30	0.64		
40	2.64	5.59	1.11	2.35	0.39	0.82		
45	3.28	6.95	1.38	2.93	0.48	1.02		
50	3.99	8.45	1.66	3.56	0.58	1.24		
60	5.59	11.8	2.35	4.99	0.82	1.73		
70	7.44	15.8	3.13	6.64	1.09	2.31	0.29	0.70
80	9.52	20.2	4.01	8.50	1.38	2.95	0.37	0.79
90			4.99	10.8	1.73	3.67	0.46	0.98
100			6.06	12.8	2.11	4.47	0.56	1.19
125			9.18	19.5	3.19	6.75	0.85	1.80
150					4.47	9.46	1.19	2.52
175					5.95	12.3	1.58	3.36
200							2.30	4.30
225							2.56	5.35
250							3.07	6.50
300							4.30	9.11

FIGURE F* (Check Fm0541 for Simplex & Duplex Information)

Recommended BASIN Diameters

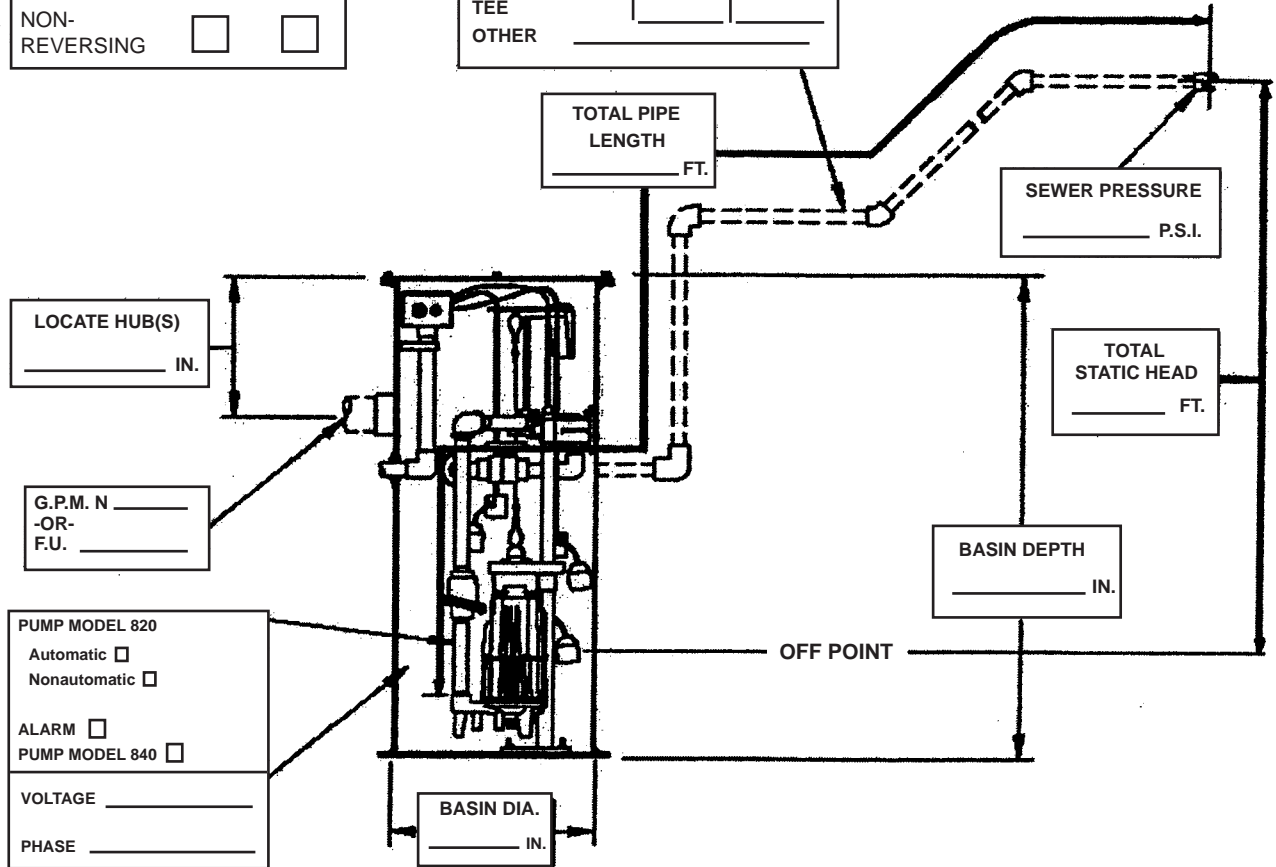
GPM	18"	24"	30"	36"	48"
20					
25					
30					
35					
40					
45					
50					
60					
70					
80					
90					
100					
125					
150					
175					
200					
225					
250					

GRINDER PUMP SIZING AND SELECTION WORKSHEET

CONTROLS (840 ONLY)		SIMPLEX		DUPLX	
AUTO REVERSING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MANUAL REVERSING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NON-REVERSING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PIPE MAT'L _____	SIZE _____	
FITTINGS	QTY.	SIZE
CHECK VALVE	_____	_____
90° ELBOW	_____	_____
45° ELBOW	_____	_____
GATE VALVE	_____	_____
TEE	_____	_____
OTHER _____	_____	_____

ASSEMBLY TYPE	INDOOR		OUTDOOR	
	PRE-PACKAGED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FIELD ASSEMBLED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



GRINDER PUMP SIZING AND SELECTION WORKSHEET

To begin, fill in the shaded areas on the front side. A calculator and additional sheet of paper may be required.

- STEP #1** Determine the type and quantity of each plumbing fixture. Multiply each by its fixture unit values in Figure "A".
Sum these values _____.
- Determine GPM from Figure "B". _____ GPM (1)
- STEP #2** Refer to Figure "C". Based on the System's discharge piping size, determine the minimum GPM listed for that size. _____ GPM (2)
- STEP #3** Select the greater of the two GPM values in #1 & #2. This is your design GPM. If greater than maximum GPM listed in Figure "B", contact factory. _____ GPM (3)
- STEP #4** Multiply each pipe fitting by its equivalent length value shown in Figure "D" and sum. _____ Ft. (4)
- STEP #5** Total pipe length from front side. _____ Ft. (5)
- STEP #6** Add #4 & #5. [(4)+(5)=(6)] _____ Ft. (6)
- STEP #7** Divide #6 by 100 and multiply it by the associated friction value from Figure "E". This is the total Friction Head. _____ Ft. (7)
- STEP #8** Determine static head in Ft., as shown on front side, from minimum water level to the discharge point. _____ Ft. (8)
- STEP #9** Sewer Pressure, if any, expressed in feet (PSI x 2.31). _____ Ft. (9)
- STEP #10** Add #7, #8, & #9. [(7)+(8)+(9)=(10)]. This is the system's Total Dynamic Head. (TDH) _____ Ft. (10)
- STEP #11** Select the Grinder Pump:
Select grinder pump from FM1478 (820) or FM1232 (840).
Base selection on design values, #3 & #10. _____ (Part No.)
Required voltage source. _____ (Volts/Phase)
- STEP #12** Select type of control, basin size, and type of assembly from FM1232

Final Notes:

- 1) Consult factory in any application where TDH is less than 5' #10.
- 2) Consult factory in those applications where the performance requirement exceeds the capability of the Model 840 Grinder.
- 3) Pump must be capable of providing the minimum required GPM for pipe size, Figure "C", at the calculated TDH #10.
- 4) Pump's lock valve must be greater than system's highest point.

FIGURE A
PLUMBING FIXTURE UNIT VALUES*

Fixture Description	Fixture Unit Valve	Fixture Description	Fixture Unit Valve
Bathtub, 1-1/2" trap	2	Sink, service type	3
Bathtub, 2" trap	3	Sink, scultery	4
Bidet, 1-1/2" trap	3	Sink, surgeons	3
Dental unit or cuspidor	1	Swimming pool (per 100 gallons)	1
Drinking fountain	1	Urinal	4****
Dsiwasher, domestic	2	Washing machine	2
Kitchen sink	2	Water closet	3****
Kitchen sink with disposal	3	Water softener	4
Lavatory, 1-1/2" tray	1	Unlisted fixture, 1-1/4" trap	2
Lavatory, barbar/beautician	2	Unlisted fixture, 1-1/2" trap	3
Laundry tray	2	Unlisted fixture, 2" trap	4
Shower	2	Unlisted fixture, 2-1/2" trap	5
Shower, group (per head)	3	Unlisted fixture, 3" trap	6
Bathroom group consisting of lavatory, bathtub or shower and water closet			6****

Graph data is taken from ASPE Handbook, Uniform Plumbing Code, Cameron Hydraulic Data and Platic Pipe Institute.

**Add 4 fixture units for each flush valve fixture

FIGURE B
PUMP CAPACITY based on total Fixture Units*

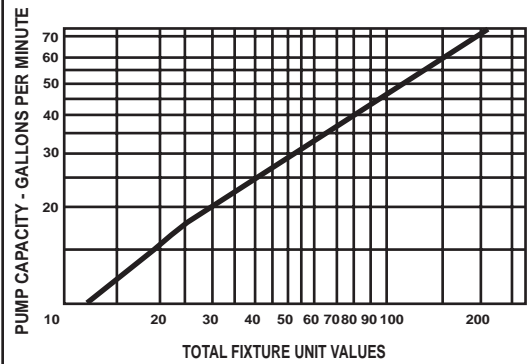


FIGURE C*

Pipe Size	Minimum GPM
1 1/4"	10
1 1/2"	13
2"	21

FIGURE D*
FRICTION FACTORS FOR PIPE FITTINGS IN TERMS OF EQUIVALENT FEET OF STRAIGHT PIPE

Nominal Pipe Size	90 Elbow	45 Elbow	Tee Branch flow	Swing Check Valve	Gate Valve
1 1/4"	3.5	1.8	6.9	11.5	0.9
1 1/2"	4.0	2.2	2.7	13.4	1.1
2"	5.2	2.8	10.3	17.2	1.4

FIGURE E*
FRICTION HEAD IN FEET PER 100' OF SCHEDULE 40 PLASTIC PIPE

GPM	1 1/4"	1 1/2"	2"
	Plastic	Plastic	Plastic
10	1.45	0.68	0.20
12	2.03	0.96	0.28
15	3.06	1.45	0.43
18	4.29	2.03	0.60
21	5.75	2.71	0.80
25	7.89	3.73	1.10
30	11.1	5.22	1.55
35	14.7	6.95	2.06
40	---	8.90	2.64
45	---	11.1	3.28
50	---	13.45	3.99
60	---	---	5.59
70	---	---	7.44