10-144

CHAPTER 241

Division of Environmental Health
Maine Center for Disease Control & Prevention
Department of Health and Human Services

STATE OF MAINE

SUBSURFACE WASTEWATER DISPOSAL RULES

SUMMARY:

This rule governs the siting, design, construction and inspection of subsurface wastewater disposal systems in order to protect the health, safety and welfare of the citizens of Maine. Approved procedures, design and siting requirements, materials, methods and administrative polices are described in detail.

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LAST AMENDED: August 3, 2015

AUTHORITY: 22 M.R.S. § 42(3), 42(3-B);
30-A M.R.S. § 4211 (5), 4215 (4), 4211 & 4452;
22-A M.R.S. § 205(2)

SECTION 4
DESIGN CRITERIA

D. DESIGN FLOWS

1. Scope: This Section governs the calculation of the design flow used for sizing disposal fields and septic tanks.

2. General: The design flows provided in this Section are based on empirical data collected over many years by numerous researchers. These design flows reflect system designs proven to function adequately over long periods of time. As such, these design flows anticipate variations in flow among different establishments of the same class as well as flow variations over time in the same establishment. These design flows also assume wastewater with strengths typical of the class of establishment.

3. Design flow: Each component of the system must be designed and installed to adequately treat and dispose of the amount of wastewater expected to be discharged from the premises to be served. Design flows for private residences are prescribed in Section 4(E) and Table 4A. Design flows for commercial or institutional establishments are prescribed in Section 4(F) and Table 4C.

E. DESIGN FLOWS FOR DWELLING UNITS

1. Single-family dwelling units: The design flows for single-family dwelling units including in-law apartments, connected to subsurface wastewater disposal systems is calculated, based on Table 4A.

TABLE 4A
DESIGN FLOWS FOR SINGLE FAMILY DWELLING UNITS

Bedrooms	GPD per dwelling unit
2 or less	180
3	270
4	360
5	450
6	540
Each additional bedroom	90 per bedroom
In-law apartment	120
Primitive disposal field	25
Limited disposal field	100
Bunkhouse	20 per bed

2. Multiple family dwelling units: The design flow for multiple family dwelling units is calculated at 120 gallons per day per unit for 1-bedroom units, and 90 gallons per day per bedroom for multiple bedroom units.

F. DESIGN FLOWS FOR OTHER FACILITIES

1. General: The design flow must be the maximum flow that may reasonably be expected to be discharged from a residential, commercial, or institutional facility on any day of operation. It must be expressed in gallons per day. The design flow must not be considered as an average daily flow. It incorporates a factor of safety over the average flows to accommodate peak wastewater flows or facilities that discharge greater than the average flows of wastewater either occasionally or on a regular basis. The design flow is calculated as follows:

2. Base flow: To determine base design flow, multiply the design flow per unit/user from the value in Table 4C by the number of units or users.

3. Employee contribution: When employees will be present at the establishment, estimate the maximum number of employees who may be present during a single day of operation. Then multiply the number of employees by the design flow per employee.

4. Design flows: The values listed in Table 4C are minimum requirements for average facilities in the categories listed and the total design flow is the result of the summation of base flow in Section 4(F)(2) and Employee Contribution in Section 4(F)(3). Where actual water use data is available relating to the facility, the Department may approve the use of an alternative design flow. In such a case, the value used for the design flow must meet the requirements in Section 4(G).

5. Non-standard design flows: Design flows which are not based upon Table 4A or Table 4C, or upon water use records, require prior review and approval from the Department.

TABLE 4C
DESIGN FLOWS FOR OTHER FACILITIES

NOTE: The design flows calculated in this table represent the design flow for purposes of calculating the septic tank capacity (Section 6(G)) and the size of the disposal field (Table 4D), unless otherwise noted. Important: See notes 1, 2, and 3 at end of Tables.

Type of facility	Design flow per user or unit
Airports	5 gpd per passenger plus 12 gpd per employee [1]
Assembly areas (Meeting hall, no seats)	2 gpd per person
Auditoriums/Stadiums:	5 gpd per seat
Bakery	100 gpd per bakery plus 12 gpd per employee [1, 2]
Bar/Tavern/Cocktail lounge	add 12 gpd per employee to each
w/ limited food	15 gpd per seat or13 gpd per patron
w/o food	10 gpd per seat or 7 gpd per patron
Barber shop	50 gpd per chair
Beauty salon	100 gpd per chair
Bed and breakfast	90 gpd per bedroom per operator's quarters and 75 gpd per rental room
Boarding houses with meals	180 gpd per house plus 40 gpd per boarder
Bottle club	10 gpd per seat plus 12 gpd per employee
Bunkhouses (no plumbing)	20 gpd per bed
Bus service areas	5 gpd per passenger plus 12 gpd per employee [1]
Butcher shop or department	100 gpd per shop plus 12 gpd per employee [1,2]
Cafeteria, open general public	30 gpd per seat plus 12 gpd per employee [1,2]
Cafeteria, private	15 gpd per seat plus 12 gpd/employee [1,2]
Campground sites served by central toilets	60 gpd per site
Campground sites served by individual water and sewer hookups	75 gpd per site
Campground/Transient dump station	50 gpd per user not served by individual water and sewer hookups
Campground park model trailer sites	125 gpd per site
Children's camps, day use only	15 gpd per camper plus 12 gpd per staff person
Children's camps, day and night	20 gpd per camper plus 20 gpd per staff person
Churches	4 gpd per seat for general seating and 8 gpd per seat for seats in a dining area
Dance hall	5 gpd per attendee plus 12 gpd per employee [1]
Day care facilities serving meals	15 gpd per child plus 12 gpd per adult
Day care facilities not serving meals	10 gpd per child plus 12 gpd per adult
Dining hall (separate from any other facility)	5 gpd per meal per seat [2]
Dog kennel (boarding and grooming)	15 gpd per dog or per run, cage, kennel or stall, whichever is greater; add 7 gpd per dog bath given; add 12 gpd per employee [5]
Eating Places	add 12 gpd per employee for each [2, 4]
Banquet /Dining hall	5 gpd per seat per meal
Cafeteria	5 gpd per customer
Catering	50 gal/ 100 sq. ft. floor space

Delicatessen, food prepared and no seats	100 gpd per deli or 1 gpd per meal served plus ~~15~~ 12 gpd per employee [1, 2] (whichever is larger)
Delicatessen, no food prepared and no seats	50 gpd per deli plus 12 gpd per employee [1]
Drive-in, no full meals and no china service	30 gpd per car space plus 12 gpd/ employee [1, 2]
Eating place, takeout	100 gpd or 1 gpd per meal served plus 12 gpd per employee [1, 2] (whichever is larger)
Eating place, paper service	7 gpd per seat plus 12 gpd/ employee [1, 2]
Ice Cream Stands, ice cream only with no seats	150 gpd per stand plus 12 gpd per employee. [1, 2]
Eating Place 1meal/day	10 gpd per seat plus 12 gpd per employee [1, 2]
Eating Place, 2 meals/day	20 gpd per seat plus 12 gpd per employee (1,2)
Eating Place, 3 meals/day	30 gpd per seat plus 12 gpd/employee [1, 2]
Specialty food stand or kiosk	50 gpd per 100 sq. ft.
Employees at place of employment with no showers	12 gpd per employee [1]
Employees at place of employment with showers	20 gpd per employee [1]
Fairgrounds/Flea market	3 gpd per attendee based on average daily attendance
Gyms, not associated with schools	10 gpd per participant plus 3 gpd per spectator plus 12 gpd per employee [1]
Type of Facility	**Design Flow per User or Unit**
Health care facility :	add 12 gpd per employee to each
Adult daycare (no overnight, 4 to 8 Hrs. per day)	25 gpd per client
Hospitals, medical	165 gpd per bed (includes laundry)
Hospitals, psychiatric	100 gpd per bed
Nursing/Convalescent home	w/ laundry 125 gpd per bed
Nursing/Convalescent home	w/o laundry 75 gpd per bed
Medical office/Dental office	80 gpd per medical staff, plus 5 gpd per patient
Residential care/ Retirement home	60 gpd per resident
Health clubs	10 gpd per participant plus 3 gpd per spectator plus ~~15~~ 12 gpd per employee [1]
Hotels and motels with shared baths	80 gpd per bedroom plus 12 gpd per employee [1]
Hotels and motels with private baths	100 gpd per bedroom plus 12 gpd per employee [1]
Hotels/Motel with kitchen	60 gpd per bed (2 person)
Hotels/Motel without kitchen	50 gpd per bed (2 person)
Laundry, self-service	300 gpd per machine plus 12 gpd per employee [1]
Limited operation hunting camp	45 gpd per owner/occupant plus 12 gpd per hunter/guest
Marina	100 gpd plus 10 gpd per slip or mooring (clothes washers are not included; design flow for clothes washers must be calculated separately); w/bathrooms add 30 gpd per slip; w/o bathrooms add 100 gpd per slip.
Medical offices, clinics, and dental offices	80 gpd per medical staff plus 5 gpd per patient plus 15 gpd/office employee [1]
Nursing Homes	150 gpd per bed plus 12 gpd per employee [1]
Parks and picnic areas, public rest rooms and no showers	3 gpd per attendee or 40 gpd per parking place, whichever is greater, plus 12 gpd per employee [1]
Parks and picnic areas, public rest rooms and showers	8 gpd per attendee or 40 gpd per parking place, whichever is greater, plus 12 gpd per employee [1
Prison/jail	120 gpd per inmate, plus 12 gpd per employee
Public restrooms	325 gpd toilet, 162 gpd per urinal, or 3 gpd per user
Rooming houses, no meals	180 gpd per house plus 30 gpd per roomer
Recreation/sporting camps	45 gpd per owner/occupant plus 25 gpd per bed/sportsperson
Rental cabins and cottages	50 gpd per bed plus 12 gpd per employee [1]
Rental cabins, housekeeping	50 gpd per cabin, plus 50 gpd per bed
Rental cabins, with no plumbing fixtures	20 gpd per bed
School, Grades Kindergarten to 12	10 gpd per student plus 12 gpd per teacher and other employees; w/cafeteria add 3 gpd per student; w/cafeteria, gym & showers add 8 gpd per student. [1]
School, boarding	75 gpd per student plus 12 gpd per teacher and other employees [1]
Dormitory/Boarding hall (no eating facilities)	40 gpd per student, plus 12 gpd per employee

Service stations	100 gpd per fuel pump cabinet or 250 gpd per toilet plus 12 gpd per employee [1]
Shopping centers or stores, public rest rooms and showers [3]	325 gpd per toilet plus 20 gpd per shower plus ~~15~~ 12 gpd per employee [1] Design flows for any eating places or butcher shops must be determined and added to total design flow.
Sports Bars	20 gpd per seat plus 12 gpd per employee [1, 2]
Sports centers	add 12 gpd per employee
Bowling center w/ snack bar	75 gal per lane
Country clubs	60 gal per member or patron
Fitness, exercise, karate or dance center	50 gal per 100 sq. ft.
Tennis or racquetball	300 gpd per court
Gyms/Health clubs (not associated with schools)	10 gpd per member, plus 3 gpd per spectator
Golf course/Driving ranges, only snack food, no showers	250 gpd per toilet
Go-kart/Motocross/Batting cages/Mini-golf	250 gpd per toilet
Pool halls/Arcades	250 gpd per toilet
Swimming pools, Bathhouses & Spas	10 gpd per person or 250 gpd per toilet
Type of Facility	**Design Flow per User or Unit**
Theaters indoor	5 gal per day per seat add 12 gpd per staff/employee
Theaters drive-in	10 gals per car space add 12 gpd per staff/employee
Veterinary hospital no boarding or grooming	250 gal per practitioner/shift [5]
w/ kennels & boarding	add 15 gpd per run, cage, kennel or stall
w/ grooming	add 7 gpd per dog bath given
Visitors center	5 gpd per visitor plus 12 gpd/ employee (Includes libraries, museums, similar uses) [1]
Warehouse	100 gpd or 12 gpd per employee, whichever is greater

NOTES:

1. The design flow for employees is based on the total number of employees present in any 24-hour period.

2. Multiply the hydraulic loading rate by 1.8 for sizing the disposal field. The initial value taken from the table is used to size the septic tank and for minimum lot size determinations.

3. 22 M.R.S. §1672 requires a public rest room for shopping centers containing 6 or more separate retail establishments with an off street public parking area of not less than 2 acres.

4. Requires an external grease interceptor sized and installed pursuant to Section 6(L).

5. Requires outlet filter in septic tank.

SECTION 6
APPROVED MATERIALS AND EQUIPMENT

A. TREATMENT TANKS, DOSING TANKS, AND GREASE INTERCEPTORS

1. Scope: This Section governs the design, installation, repair, and maintenance of septic tanks, aerobic treatment tanks, dosing tanks, grease interceptors, post-septic tank effluent filters, and piping.

2. Abandoned septic tanks: The property owner or property owner's agent is responsible for seeing to it that the contents of all abandoned septic tanks are pumped and disposed of properly. The top or entire septic tank must be removed and the remaining portion of the septic tank or excavation must be filled immediately.

B. SEPTIC TANK REQUIRED

Wastewater must be treated by an approved septic tank prior to being discharged into a disposal field, unless the applicant receives a primitive system permit, as described in Section 4 or a holding tank permit as described in Sections 8 and 9. The use of an aerobic treatment unit or any other device in lieu of, or in conjunction with, a septic tank not be permitted by the LPI without prior approval of the device by the Department.

C. SEPTIC TANK CONSTRUCTION MATERIALS

1. General: Septic tanks may be constructed of the following materials: reinforced poured-in-place concrete, precast reinforced concrete, fiberglass, or polyethylene. Each septic tank model must be approved by the Department. Metal septic tanks are prohibited.

2. Concrete: Concrete used in the construction of septic tanks must meet the American Concrete Institute (ACI) standards for frost resistance (ACI 318-16-4.5.1) and water-tightness (ACI 318-16-4.5.2).

3. Fiberglass: Prefabricated fiberglass septic tanks must meet the American Society for Testing and Materials (ASTM) Standard ASTM D4021.

4. Polyethylene: Prefabricated polyethylene septic tanks must meet the requirements of the Canadian Standards Association (CSA) Standard B66-10, or the most current edition of the CSA tank standard. Prefabricated polyethylene septic tanks must be listed in the CSA records as CSA certified.

D. SEPTIC TANK DIMENSIONS

1. Liquid depth: When the tank is filled to its maximum capacity, the depth of the liquid in the septic tank must be at least 30 inches.

2. Air space: The interior distance between the top of the outlet pipe tee or baffle and the top of the septic tank must be at least 1 inch.

3. Configuration: Tanks must be constructed such that the direction of flow is along the longest inside dimensions.

4. Rectangular septic tanks: The inside length, measured from inside wall to inside wall, must not be less than 74 inches.

5. Cylindrical septic tanks: Upright cylindrical septic tanks must have a minimum diameter of 52 inches. Horizontal cylindrical septic tanks must have a minimum length of 72 inches. Their minimum width at the maximum liquid level must be 36 inches.

E. INLET AND OUTLET CONNECTIONS

1. General: Inlet and outlet connections of each septic tank or compartment must be designed to obtain effective retention of scum and sludge. All connections and baffles must be fastened with and constructed of, or coated with, materials that are resistant to corrosion. Where pipe tees are used, the pipe tees must be sanitary pipe tees and installed in a manner that provides a lasting watertight seal between the pipe tee and the wall of the septic tank. To obtain a watertight seal, a manufactured waterproof coupling may be incorporated into the wall of the septic tank. Expanding grout that will adhere both to the pipe tee and to the body of the septic tank where the pipe tee is installed may be used instead.

2. Baffles: A baffle or pipe tee not less than 4 inches in diameter is required at both the inlet and the outlet of a septic tank. The bottom of the baffle or of the vertical leg of the pipe tee at the inlet end of the tank must extend below the maximum liquid level at least 20 to 30 percent of the total liquid depth. The baffle or pipe tee at the outlet must extend from within 1 or 2 inches of the top of the tank to at least 16 inches below the maximum liquid level. It must block the outlet so that solids and scum cannot exit from the tank. A septic tank filter may be used in lieu of the outlet baffle.

3. Inlet connections: The invert elevation of the septic tank inlet must be at least 2 inches higher than the invert elevation of the septic tank outlet or the outlet of the first compartment. The inverts of the inlets of subsequent compartments must be at least 1 inch above their outlets. When a baffle is used, the inlet pipe must be flush with the inside wall of the tank to prevent a buildup of solids between the inlet and the baffle.

4. Outlet connections: Outlet connections must be permanently fastened in place.

F. ACCESS OPENINGS FOR ALL SEPTIC TANKS

1. All septic tanks: Access openings for septic tanks must meet the following requirements:

   (a) Minimum access opening: All septic tanks must be constructed to provide an access to each tank compartment. Each access must be: at least 18 inches along the side, if square; at least 18 inches in diameter, if round; and as nearly as possible centered over the compartment.

   (b) Additional openings: Additional inspection openings, at least 6 inches square or 6 inches in diameter, must be located on the top of the tank directly above the tank inlet and outlet connections.

2. Single-family dwelling units: Access opening for septic tanks serving single-family dwelling units must meet the following requirements:

   (a) Access openings: Access openings for septic tanks serving single-family dwelling units may be buried, although watertight risers to within 6 inches of finish grade are required, in order to simplify location and maintenance. The riser must be located at the appropriate opening to facilitate pumping. The riser opening must be at least 18 inches in diameter over the tank cover and a separate riser must be extended to grade, if there is a pump station within the tank. The pump station riser must be sized to accommodate removal and installation of any pump(s) within the tank. Outlet baffles that utilize an effluent filter must have a riser of at least 18 inches in diameter extended to finish grade.

   (b) Septic tank covers: Buried septic tank covers must be removable and flush with the tank top. Concrete tank covers must be chamfered on all edges. They must have a steel lifting loop equal to a #2 reinforcing bar, which is cast in place and projects enough for a 1and ½-inch diameter object to pass through the loop. Tank covers made from other materials must be lift-out, screwed, or bolted. They must have 2 pieces of 12-inch reinforcing bar laid in an "X" over each opening so a metal finder can locate the openings.

3. Other facilities: Access to all septic tanks serving facilities other than single family dwellings must be located at grade as described in this Section. Grade must slope away from the openings.

   (a) Compartment manholes: Manholes must have a watertight riser of the same material as the tank. Use H-20 construction in traffic areas. Provide bolted, gas tight, or locking covers where appropriate.

4. Garbage disposal: Garbage disposals should not be used with disposal fields. However, if such units are proposed to be used, other measures must be taken, such as:

   a) increasing septic tank capacity by a minimum of 30 percent;

   b) the installation of a second septic tank installed in series; or a multiple compartment septic tank (specified in Section 6(G)(6);

   c) the use of septic tank outlet filters; and

   d) must be included in the system design to prevent suspended solids from entering the disposal field.

G. LIQUID CAPACITY OF SEPTIC TANKS

1. The minimum liquid capacity of the septic tank(s) serving 1 to 3-family dwelling units must meet the capacity requirements of Table 6A for each dwelling unit. For example, a duplex comprised of one two-bedroom unit and one three-bedroom unit would require a septic tank capacity of 1,750 gallons.

2. Septic tank size for other than 1 to 3-family dwelling units: When serving structures other than 1 to 3-family dwelling units, the liquid capacity must be a minimum of 150 percent of the design flow prescribed in Section 4, or as specified in Section 6(G)(3), whichever is greatest.

3. Minimum septic tank size: The minimum liquid capacity of an individual septic tank must be 750 gallons for any use.

4. Septic tanks for engineered systems: Multiple compartment or multiple septic tanks are required for institutional and commercial installations where the design flow (determined as prescribed in Section 4) is greater than 2,000 gallons.

TABLE 6A
SEPTIC TANK CAPACITY FOR DWELLING UNITS

Number of bedrooms per Unit	Minimum septic tank liquid capacity per Unit
1 Bedroom	750 gallons
2 Bedrooms	750 gallons
3 Bedrooms	1,000 gallons
4 Bedrooms	1,000 gallons
5 Bedrooms	1,250 gallons or
For each additional bedroom	250 gallons per bedroom

5. Multiple septic tanks: 2 or more septic tanks may be connected in series to obtain the minimum required liquid capacity, provided each septic tank has a capacity at least as great as the preceding septic tank.

6. Multiple compartment septic tanks: Multiple compartment septic tanks must meet the following requirements:

   (a) Minimum liquid capacity: The total liquid capacity of the multiple compartment tank must be at least 750 gallons;

   (b) Sizing the first compartment: The first compartment must have a minimum liquid capacity at least 66 percent of the total required liquid capacity, determined pursuant to Section 6(G)(2);

   (c) Number of compartments: Septic tanks with total liquid capacities of less than 1,250 gallons may have only 1 or 2 compartments, while septic tanks with total liquid capacities greater than 1,250 gallons may have more than 2 compartments; and

(d) Connecting compartments or multiple septic tanks: Multiple compartments may be provided by connecting individual septic tanks in series. Where a single partitioned septic tank is used, vent holes must be installed near the top of each partition to allow free exchange of evolved gases between compartments. The 2 compartments must be connected by means of a pipe tee, baffle, or septic solids retainer.

H. TANK INSTALLATION

1. Fill requirements for tank installations: The fill material around septic tanks, dosing tanks, holding tanks, aerobic treatment tanks and external grease interceptors must be free of large stones, roots, or foreign objects. It must be placed in layers and must be thoroughly tamped in a manner that will avoid undue strain on the septic tank. For prefabricated plastic or fiberglass septic tanks, the fill material must not be thicker than the thickness recommended by the manufacturer.

2. Minimum setback distances: Septic tanks must be located with a minimum distance between system, structure(s), and any other site elements pursuant to first-time system criteria or replacement system criteria, as appropriate.

3. Anti-floatation: Provisions must be made to prevent the tanks from floating, if empty.

4. Leakage: Provisions must be made to prevent surface and subsurface water from entering the tanks.

5. Traffic loading: When tanks are installed under a driveway, parking lot, or other areas subject to heavy loads, the tanks must be able to withstand an American Association of State Highway Transportation Officials (AASHTO) H-20 wheel load.

6. Bedding: All tanks must be bedded on a 4-inch minimum layer of clean sand, gravel, or stone. The bedding material must extend at least 4 inches beyond the base of the tank.

7. Level and accessible: All tanks must be set level and, if an elevation and location is specified on the HHE-200 Form, at that elevation. Tanks must be readily accessible for maintenance and cleaning.

8. Testing: All tanks with a seam below the outlet invert installed 50 feet or less from the high water mark of a major water body/course or a private potable water supply, or less than 150 feet from a public water supply, must be tested in place, according to the following procedure:

   (a) The tank is to be filled with water to the outlet invert;

   (b) After 24 hours, the water level must be topped off to the outlet invert;

   (c) After 4 hours, the depth from the water surface to the top of the outlet invert is measured. If the value is 1 inch or less, the tank is deemed water-tight.

I. MAINTENANCE AND SLUDGE DISPOSAL

1. Maintenance: Septic tanks and other treatment tanks should be regularly maintained. As a general rule, the tank contents should be removed whenever the sludge and scum occupies one-third of the tank’s liquid capacity.

2. Septage disposal: All septage must be disposed of at a location approved by the Maine Department of Environmental Protection.

J. DOSING TANKS

1. General: All dosing tanks must be watertight. Materials and construction specifications are the same as those specified for septic tanks in this Section. Manholes for dosing tanks must terminate a minimum of 4 inches above the ground surface.

2. Frost protection: In cases where the dosing tanks will be installed above the maximum expected depth of frost penetration, dosing tanks must be protected with at least 2 inches of high density expanded rigid polystyrene.

3. Dosing compartments: When a dosing compartment is located inside a septic tank, the dosing compartment must not reduce the minimum tank liquid capacity required in Section 6(G).

4. Access openings: Access openings for dosing tanks may be buried, although watertight risers to within 6 inches of finish grade are required, in order to simplify location and maintenance. The riser must be located at the appropriate opening to facilitate pumping. The riser opening must be at least 18 inches in diameter over the tank cover and a separate riser must be extended to grade. The riser must be sized to accommodate removal and installation of any component(s) within the tank.

K. AEROBIC TREATMENT UNITS

1. General: The use of an aerobic treatment unit or any other device in lieu of, or in conjunction with, a septic tank must not be permitted by the LPI without prior approval of the device by the Department. Any aerobic treatment tank used in lieu of, or in conjunction with, a septic tank must bear the endorsement of the National Sanitation Foundation's Standard 40, or other endorsement accepted by the Department; or review and approval from the Department.

2. Use of an aerobic treatment unit allows disposal area size modification pursuant to Section 4(H).

L. EXTERNAL GREASE INTERCEPTORS

1. General: Any new commercial or institutional food preparation facility, such as a restaurant, cafeteria, institutional kitchen, or other facility subject to Footnote 2 of Table 4C, served by a subsurface wastewater disposal system, must install an external grease interceptor.

2. Any converted or expanded commercial or institutional food preparation facility requires an external grease interceptor, except when not practical, as determined by the LPI. In such a case, an internal grease interceptor must be used, meeting the requirements of the Plumber's Examining Board Installation Standards, 02-395 CMR 395 or, if the design flow of the facility is 100 gpd or less, a high efficiency outlet filter may be installed in the septic tank, in lieu of an external grease interceptor.

3. Location: The external grease interceptor must be installed in a separate line serving that part of the plumbing system into which the external grease will be discharged. The external grease interceptor must be located close to the source of the wastewater (to keep the grease from solidifying). External grease interceptors must be installed with an access cover to the surface and located, designed and installed in a manner that will permit easy access for inspection, repair, and cleaning.

4. Sizing the external grease interceptors for restaurants: Equation 6B must be used to determine the minimum size of external grease interceptors serving restaurants.

4. Sizing the external grease interceptors for cafeterias and institutional kitchens: Equation 6B must be used to determine the minimum size of external grease interceptors serving cafeterias and institutional kitchens.

Equation 6B

Q=[M][GL][ST][LF]

where:
Q is the liquid capacity of external grease interceptor, gallons;
M is the total number of meals served per day;
GL is the gallons of wastewater per meal, typ. 2.0 gallons
ST is the storage capacity, typ. 2; and
LF is a loading factor depending on type of facilities present:
LF is 1.0 with dish washing; and;
LF is 0.5 without dish washing.

6. Minimum size: In no case may an external grease interceptor serving a restaurant, cafeteria, or institutional kitchen be smaller than 750 gallons liquid capacity.

7. Construction: The minimum requirements for construction, materials, and foundations of external grease interceptors are the same as those required for septic tanks. The installation must be in accordance with 6(H).

8. Outlet baffle of grease trap: The outlet of the external grease interceptor must be provided with pipe tee baffle extending to a depth of 12 inches above the tank floor and well above the maximum liquid level. A septic tank filter may be used in lieu of the outlet baffle.

9. Maintenance: All external grease interceptors must be routinely inspected to determine the volume present. All external grease interceptors must be cleaned when the volume of external grease equals no more than 50 percent of the liquid capacity of the tank.

M. PIPING

1. Scope: This Section governs the design and installation of the piping systems used to convey wastewater from the building drain to the septic tank, to the disposal field and within the disposal field.

2. Methods of distribution: The allowed methods for discharge of septic tank effluent to the disposal field and distribution of septic tank effluent within the disposal field are as follows:

   (a) Gravity flow method;

   (b) Gravity dosing method;

   (c) Low pressure dosing method; and

   (d) Serial dosing method.

3. Alternating pumps: Alternating pumps may be used to alternately dose a field or portion of a field. However, no disposal field or portion of a disposal field may receive more than the maximum daily disposal design flow allowed in Section 4. Alternating pumps must be installed in pump-dosed systems with design flows of more than 2,000 gpd.

4. Connecting Pipes and Delivery Pipes: The connecting pipes between the components of a system must meet the following requirements:

   (a) Gravity flow piping: The pipes must be sized to serve the connected fixtures, but in no case may be less than 3 inches in diameter (1.5 inches for primitive systems);

(b) Pump discharge piping: The pipes must be sized to serve the pump but in no case may have a diameter less than that required by the manufacturer.

(c) Siphon discharge piping: The pipes from dosing tanks using siphons must be one nominal pipe size larger than the siphon to facilitate venting.

5. Piping materials: Pipes must be constructed of:

(a) Plastic pipe: Polyvinyl Chloride plastic (ASTM D2665), Schedule 40, SDR-21, SDR-26, or SDR-35; or Acrylonitrile-Butadiene-Styrene plastic (ASTM 2661); or Polyethylene, straight wall (ASTM D-1248);

(b) Iron pipe: Ductile cast-iron; or

(c) Other pipe: Other material permitted by the Department.

6. Joints: All pipe joints must be made watertight. All joints should be tight enough to prevent entry by roots.

7. Bedding the pipe: Pipes must be laid on a firm foundation. Pipes must be protected from freezing if there is any possibility of liquid remaining in the pipes.

8. Cleanouts: At least one cleanout must be provided for every 100 feet of connecting pipe in a gravity system.

9. Alignment and grade: The alignment and grade of connecting pipes must meet the following requirements:

Minimum pitch: Connecting pipes must have a minimum grade as follows:

(a) Building sewer: The minimum pitch of the building sewer is ¼ inch per foot (2 percent). For pipes 4 inches in diameter or larger, 1/8-inch per foot (1 percent) may be authorized by the LPI. The building sewer may not be smaller in diameter than the building drain.

(b) Effluent line (gravity): The minimum pitch of the gravity effluent line is 1/8-inch per foot (1 percent).

(c) Pipe alignment: Connecting pipes must be laid in a continuous grade and as nearly as possible in a straight line. Drop manholes may be installed if found necessary. Horizontal bends, where required, must not be sharper than 45 degrees. The inside angle between adjacent sections of pipe must be no less than 135 degrees.

11. Frost protection: In cases where the delivery pipe from the dosing tank will be installed higher than the maximum expected depth of frost penetration, the design shown in the application for a disposal system permit must specify either that the delivery pipe will drain at the end of each dosing cycle or be provided with a minimum of 2 inches of high-density expanded rigid polystyrene insulation, or otherwise be protected from frost.

12. Separation of a structure's water service and building sewer: A structure's water service pipe and the building sewer must be separated by undisturbed or compacted earth. The water service pipe may only be placed in the same trench as the building drain and building sewer when installed in compliance with the following requirements:

(a) Minimum vertical separation: The bottom of the water service pipe at all points must be a minimum of 12 inches above the top of the sewer at its highest point;

(b) A separate shelf for water service: The water service pipe must be placed on a solid shelf excavated at one side of the common trench; and

(c) Piping requirements: The drainage pipe must conform to one of the standards for ABS plastic pipe, ductile cast iron pipe, or PVC plastic pipe listed in Table 6I.

13. Separation between public water main and building sewer: A building sewer or force main must be at least 10 feet horizontally from any existing or proposed public water main, measured edge to edge. In cases where it is not practical to maintain a 10-feet separation, the design shown in the application for a disposal system permit must insure that a leak in the building sewer will not contaminate the public water main. The allowed methods for protecting public water mains are described below:

    (a) Separate trenches: The building sewer is laid in a separate trench, or

    (b) Same trench: If the building sewer and public water main are in the same trench, the public water main must be on an undisturbed earth shelf at such an elevation that the bottom of the public water main is at least 18 inches above the top of the building sewer. Concrete encasement of the building sewer joints is required.

14. Building sewer crossing a public or private water main: When a building sewer or force main crosses a public or private water main, the design shown in the application for a disposal system permit must insure that a leak in the building sewer will not contaminate the water main. The allowed methods for protecting water mains are described below:

    (a) Gravity building sewer: One 10-foot length of building sewer pipe must be located, so that both joints will be as far from the water main as possible. The building sewer must be supported to prevent sagging and damage from backfilling. It must be protected from freezing.

    (b) Force main: At least 10 feet of the force main perpendicular to the water main must be encased in a second sewer pipe of like material with the ends sealed with concrete. The force main must be supported to prevent sagging and damage from backfilling. It must be protected from freezing.

N. DISTRIBUTION PIPES

1. Gravity flow and gravity dose distribution networks: Gravity flow and gravity dosing distribution networks may consist of a single distribution pipe, two or more distribution pipes connected by means of elbows or tees, or two or more separate distribution pipes connected independently to a distribution box. Distribution pipes must meet all the requirements of this Section.

2. Minimum diameter: Distribution pipes must be a minimum of 3 inches in diameter (2 inches for primitive systems, and not to exceed 2 inches).

3. Piping: Distribution pipes must consist of lengths of rigid, perforated pipes connected with tight joints. Individual runs of distribution pipe must be capped at the end, unless the pipes are to be connected together by loops, header pipe, overflow pipe, or other cross-connections as specified by the system design plans.

4. Perforations: There must be two rows of evenly spaced perforations running the length of the distribution pipe. The rows must be on each side of the pipe, midway between the invert and the center line that separates the upper and lower halves of the pipe; i.e., at the 4 o'clock and 8 o'clock positions. Perforations must be no smaller than 3/8 inch and no larger than ¾ inch in diameter.

5. Pitch: Each individual distribution pipe must be set level, not to exceed a slope of 2 inches in 100 feet.

6. Spacing: The distance between pipes must be no greater than 5 feet and no less than 1 foot. Pipes must be no more than 5 feet and no less than 1 foot from the sidewalls.

7. Pipe material: The following materials are acceptable for distribution pipes: Plastic pipe meeting the following: Acrylonitrile-Butadiene-Styrene (ASTM D-2751); Polyvinyl Chloride (ASTM D-2729, D-3034); Styrene-Rubber (ASTM D-2852, D3298); or Polyethylene, straight wall (ASTM D-1248).

O. DISTRIBUTION BOXES

1. General: The use of distribution boxes is optional but is encouraged to allow access for maintenance and troubleshooting purposes.

2. Construction: Distribution boxes must be constructed of sound and durable materials that will resist decay or corrosion, frost damage, cracking, or buckling due to backfilling or other anticipated stresses.

3. Installation: The distribution box must be set perfectly level, on a firm base, carefully backfilled to prevent settlement or other movements and must be installed as follows:

   (a) Disposal fields: When possible, the distribution box should be installed directly on the disposal field stone to minimize frost disturbance.

   (b) Minimum footings: For engineered systems, the distribution box must be set on a layer of gravel or on a concrete footing extending downward below the maximum expected depth of frost penetration. Where gravel is used, the gravel must extend laterally a minimum of 6 inches beyond the side of the distribution box, meet the gradation specifications of the Maine Department of Transportation Standard Specifications - Revision of December 2002 – Section 700 – Materials 703.06 Aggregate for Base and Sub-base, and must be compacted to 95 percent modified proctor per ASTM D2940 - 03 Standard Specification for Graded Aggregate Material For Bases or Sub-bases for Highways or Airports.

4. Outlets: A separate outlet must be provided for each distribution pipe. The inverts of all outlets must be rigidly set at the same level a minimum of 1 inch above the bottom of the distribution box. When installation is complete, the distribution box must be filled with water, at which time the installation must be checked to make sure that it is level. Check to make sure that the water rests equally at the invert of each pipe. Necessary adjustments must be made to ensure that all outlets are permanently and securely fixed at exactly the same elevation prior to backfilling.

5. Inlets: For gravity-fed distribution boxes, the invert of the inlet must be at least 1 inch above the invert of the outlets. When dosing is employed or when the connecting pipe from the septic tank has a steep slope, measures must be taken to prevent direct flow of septic tank effluent across the distribution box outlets. This direct flow may be prevented by installing a baffle or elbow to direct the flow to the bottom of the box within the distribution box, by connecting the inlet to the bottom of the distribution box, or by using two distribution boxes connected in series. In the latter case, all outlets of the first distribution box must be sealed off, except for the outlet that discharges to the second distribution box.

6. Access: Distribution boxes must be provided with a means of access. In the case of smaller boxes, access may be made by a removable lid. Access to larger boxes may be provided by means of manholes and inspection ports with removable, watertight covers. In all cases, the following requirements must be met:

   (a) Size and location: Access openings must be adequate in size and located to facilitate removal of accumulated solids and inspection of the inlet and all outlets.

   (b) Access opening extensions: All access openings must be extended to within 12 to 18 inches of the finished grade surface.

   (c) Water-tightness: Access openings must be constructed in a manner that prevents the entrance of water.

7. Frost protection: In cases where the distribution boxes will be installed higher than the maximum expected depth of frost penetration, distribution boxes must be protected by a minimum of 2 inches of high density expanded rigid polystyrene to give protection against frost penetration. In addition, entering through the bottom of the distribution box is recommended to prevent freezing associated with forced main inlets.

P. DROP BOXES

1. General: The use of drop boxes is optional. Drop boxes provide an effective way to assure that serial distribution disposal fields are properly loaded. They also provide a means for monitoring the water levels in respective disposal fields. When drop boxes are used:

   (a) Overflow elevation: The overflow pipe to the next disposal field must be installed so that the upper disposal field is full to the invert of the distribution piping of septic tank effluent before flow spills over to the next disposal field being served from the box;

   (b) Overflow piping: The overflow pipe between drop boxes must be watertight. Drop boxes must be placed in a trench dug only deep enough to allow connection to the next lower drop box. The soil backfilled around the overflow pipe must be carefully compacted below and around it to prevent seepage along the pipe between disposal field laterals;

   (c) Installation: The drop boxes must be set on a firm base and carefully backfilled to prevent settlement or other movements; and

   (d) Bypass capability: The drop boxes must be of such design that a disposal field lateral can be removed from service and the flow shunted to the next disposal field lateral, if necessary.

2. Frost protection: In cases where the drop boxes will be installed higher than the maximum expected depth of frost penetration, the design shown in the application for a disposal system permit must specify that drop boxes are surrounded by 2 inches of high-density expanded rigid polystyrene, to protect against frost penetration and freezing.

Q. DOSING TANKS FOR ENGINEERED SYSTEMS

1. When required: If a dosing tank with a siphon or pump is required for engineered systems using gravity or low pressure dosing, it must meet the requirements of this Section.

2. Minimum liquid capacity: The minimum liquid capacity of dosing tanks using pumps must be determined as follows:

   (a) Minimum capacity: Dosing tanks using pumps must have sufficient liquid capacity to distribute septic tank effluent equally to all parts of the disposal field during each dosing cycle. They must also provide adequate reserve storage capacity (at least equal to the minimum dosing volume) in the event of a pump malfunction. The total liquid capacity must be great enough to accommodate the minimum required dose volume, plus the minimum required reserve storage capacity determined as prescribed in Section 6(Q)(3). Additional volume must be provided above the pumping level to accommodate the volume of water displaced by the pump and controls, as well as any quantity of septic tank effluent that will drain back into the dosing tank when the pump shuts off at the end of a dosing cycle. To summarize, minimum dosing tank capacity is the sum of dose volume, reserve storage, pump and control displacement, and effluent drain-back.

   (b) Solid storage: Additional volume must be provided below the pumping level so that the pump may be placed on a pedestal, above the dosing tank bottom, to prevent the pump from drawing in air or whatever solids may accumulate in the bottom of the dosing tank.

3. Reserve capacity when using pumps: Reserve capacity is the inside volume of the dosing tank that lies between the level at which the high water alarm switch is set and the invert elevation of the tank inlet. A minimum reserve capacity equal to the design flow is required except where a standby pump is provided that is equivalent in performance capacity to the primary pump and that will switch on automatically in the event that the primary pump malfunctions.

4. Dose volume and minimum reserve capacity: The dose volume and minimum reserve capacity for gravity-dosed disposal fields must be 15 to 25 percent of the design flow, the pump dose off-switch must be at least 6 inches above the pump intake.

5. Dosing tanks using a single siphon: The liquid capacity of dosing tanks using siphons must be adequate to provide the required dose volume determined as prescribed in Section 6(Q)(4). No reserve capacity is required when a siphon is used.

6. Requirements for all dosing tanks: All dosing tanks must meet the following requirements regardless of whether a pump or siphon is used.

   (a) Construction: The requirements for the construction of dosing tanks must comply with those prescribed for septic tanks in Section 9. Dosing tanks may be constructed as a separate unit or may share a common wall with the septic tank.

   (b) Installation: Installation requirements for pre-fabricated dosing tanks must comply with those for septic tanks, as prescribed in Section 6(H).

   (c) Inlet elevation: Inlets must be at least 1 inch above the highest water level attained when the entire reserve capacity is full.

   (d) Access openings: Dosing tanks must be readily accessible for service and repair.

7. Backfilling: Requirements for backfilling around dosing tanks are the same as for septic tanks, specified above.

R. SPECIFIC REQUIREMENTS FOR DOSING WITH SIPHONS

1. General: Dosing may be accomplished by means of an automatic siphon when the low water level in the dosing tank is at a higher elevation than the invert of the highest distribution pipe. All requirements in this Section must be met.

2. Siphon tank outlets: Outlets for dosing tanks using siphons must conform to the manufacturer's recommendations;

3. Corrosion control: Siphons must be constructed of durable materials not subject to corrosion by acid or alkali;

4. Sizing dosing tanks: The horizontal dimensions of the dosing tank must be adjusted, so that the volume obtained by multiplying the manufacturer's rated siphon drawing depth by the internal horizontal area of the dosing tank will be equal to the required dose volume determined, as prescribed in Section 6(Q)16; and

5. Starting siphons: When installation is complete, the siphon must be primed and checked in the presence of the LPI by filling it with water. At this time, the siphon must be checked for leaks, as evidenced by air bubbles rising from the bell casing or piping. Any leaks must be repaired before final approval is given.

6. Gravity dosing: In gravity dosing systems, when the delivery pipe between the dosing tank and the distribution box or distribution network is long, the siphon invert must be set at an elevation sufficiently higher than the invert of the highest distribution pipe to compensate for any head losses due to friction in the connecting pipe. Friction head must be determined using Table 6(I).

7. Low pressure dosing: In low pressure dosing systems, the invert of the siphon must be set higher than the invert of the distribution pipes by a distance equal to the total operating head. See EPA's *On-site Wastewater Design Manual* for additional guidance.

8. Peak inflow check: For facilities from which large quantities of septic tank effluent may be discharged at one time, the designer must make certain that the siphon discharge rate will not be exceeded by the maximum expected rate of inflow at time of peak volume.

9. Cycle counter: Each siphon-equipped dosing tank must employ a cycle counter, activated by a weighted float or switch, to monitor siphon performance.

10. High water alarm: Dosing tanks using siphons must be equipped with an overflow to the distribution box (or distribution network) and a high-water alarm meeting the requirements for holding tanks. The invert of the overflow must be just above the level of the high-water alarm switch which, in turn, must be several inches above the normal high-water level of the dosing tank.

S. SPECIFIC REQUIREMENTS FOR DOSING WITH PUMPS

1. General: Dosing may be accomplished by means of a pump when either gravity dosing or low pressure dosing is used. All requirements in this Section must be met.

2. Duplicate pumps required: Duplicate pumps are required for systems serving multifamily residential structures or systems.

3. Pump rating: The pump must be rated by the manufacturer to handle septic tank effluent.

4. Minimum pump performance: Pumps used for gravity dosing systems must be rated by the manufacturer (as indicated by the manufacturer's pump performance curve) to be capable of delivering the total required dose volume within a period of 15 minutes or less when working against a total dynamic head equal to the total design operating head. For the purpose of making this determination, the total design operating head must be considered as the sum of the elevation head and the friction head calculated using Table 6(I).

5. Pump selection for low pressure dosing: Selection of an adequate pump for low pressure dosing is part of the design procedure for low pressure dosing systems.

6. Solid storage: Pumps must be set on a pedestal or have legs, so that the intake is elevated several inches above the bottom of the dosing tank.

7. Couplings: Easy or "quick disconnect" couplings should be used to facilitate removal of the pump for servicing.

8. Peak inflow check: For facilities from which large quantities of septic tank effluent may be discharged at one time, the design must make certain that the pump discharge rate will not be exceeded by the maximum expected rate of inflow at times of peak volume.

9. Pump switches: The operation of the pump must be controlled by means of automatic switches that are activated by the rising and falling level of septic tank effluent in the dosing tank. Such switches must meet the following requirements:

   (a) Switches: Switches must be able to withstand the humid and corrosive atmosphere in the dosing tank. Mercury or weighted float type switches are suitable for this purpose. Pressure diaphragm type switches are prohibited.

   (b) Dose volume: For single-family dwellings the dose volume for gravity-dosed disposal fields must be as per manufacturers' specifications.

10. High-water alarm: A high-water alarm switch must be set 4 inches above the pump-on switch and must activate visible and audible alarms that can be readily seen and heard by occupants within the structure served. The high-water alarm switch must meet the requirements prescribed for pump-control switches Section 6(S)(9)(a). The alarm and its switch must not be on the same electrical circuit as the pump and its switch.

T. VENTING

1. General: Vents are not required (unless required by the component manufacturer) but may be used in disposal systems. If used, vents should meet the following design and construction standards:

   (a) Location: A vent should be installed in the distribution system at a point or points farthest from the septic tank;

   (b) Size: A vent diameter should be equal to or greater than the diameter of the dosing piping;

   (c) Height: A vent must extend at least 3 feet above the finished grade; and

   (d) Protection: All vents should be screened to prevent entry of foreign objects and installed in a manner which prevents entry of rainwater.

U. MANUFACTURED DISPOSAL AREAS

1. General: Approved proprietary disposal devices may be used in lieu of a stone filled disposal field. A potential purchaser is advised to obtain information pertaining to the relative cost, availability, installation procedures, method of wastewater distribution, and specific design considerations.

2. Requirements: The use of proprietary disposal devices may be approved, provided they meet the following conditions:

   (a) The square footage of the bottom and sidewall area of proprietary disposal devices varies from one manufacturer to another. Therefore, the required number of proprietary disposal devices from a specific manufacturer is determined by dividing its standard stone-filled square-footage equivalent into the total bottom and sidewall area, determined by multiplying the appropriate minimum hydraulic loading rate, from Table 4E and the design flow, from Section 4;

   (b) When proprietary disposal devices are used in a cluster configuration, only the unshielded bottom area can be used to determine its standard stone-filled disposal-field equivalent;

   (c) When proprietary disposal devices are used in a trench configuration, only the sum of its unshielded bottom and sidewall area can be used to determine its standard stone-filled disposal-field equivalent;

   (d) The number of proprietary disposal devices must be rounded up to the nearest whole disposal device;

   (e) The separation distance between groups of proprietary disposal devices is identical to the distances required for a standard stone filled disposal field;

   (f) Gravity, low pressure, or serial distribution may be used;

   (g) Proprietary disposal devices must be installed level and must be bedded and covered per each manufacturer's recommendations; and

   (h) In all other respects, each proprietary disposal device installation must comply with these Rules.

V. CONCRETE DISPOSAL DEVICES

1. Manufacturers: Manufacturers must be approved by the Department.

2. Sizing requirements for 4-foot-by-8-foot disposal devices: When used in clusters, the disposal fields are sized according to bottom area only. Each 4-foot-by-8-foot disposal device has an effective disposal infiltration area of 64 square feet.

(a) When used in trenches with one foot of stones along the 4-foot sidewalls, each 4-foot-by-8-foot disposal device has an effective disposal infiltration area of 77 square feet. A separation distance of 3 feet from edge of stone to edge of stone is required when used in trench configuration.

(b) When used in trenches with one foot of stone along the 8-foot sidewalls, each 4-foot-by-8-foot disposal device has an effective disposal infiltration area of 90 square feet. A separation distance of 3 feet from edge of stone to edge of stone is required when used in trench configuration.

3. Sizing requirements for 8-foot-by 8-foot disposal devices: When used in clusters, each 8-foot- by-8-foot disposal device has an effective disposal infiltration area of 128 square feet. When used in trenches with one foot of stone along two sidewalls, each 8-foot-by-8-foot disposal device has an effective disposal infiltration area of 154 square feet. A separation distance of 3 feet from edge of stone to edge of stone is required when used in trench configuration.

4. Sizing requirements for 4-foot-by-10-foot disposal devices: When used in clusters, each 4-foot-by-10-foot disposal device has an effective disposal infiltration area of 80 square feet. When used in trenches with one foot of stone along the 4-foot sidewalls, each 4-foot-by-10-foot disposal device has an effective disposal infiltration area of 93 square feet. When used in trenches with one foot of stone along the 10-foot sidewalls, each 4-foot-by-10-foot disposal device has an effective disposal infiltration area of 113 square feet. A separation distance of 3 feet from edge of stone to edge of stone is required when used in trench configuration.

W. PLASTIC DISPOSAL DEVICES

1. Manufacturers: Manufacturers must be approved by the Department.

2. Configuration: These devices may be installed in trench or cluster configuration. A 3-foot horizontal spacing must be maintained between trenches. This spacing is in addition to any coarse material used adjacent to the devices.

3. Sizing: These devices have an effective disposal infiltration area in square feet per linear foot as specified in Table 6B.

TABLE 6B

Sizing for "Bio-Diffuser", "Infiltrator", "EnviroChamber", and "Contactor" proprietary disposal devices

Device	Model	Height	Configuration	
			Cluster	Trench
Bio-Diffuser	Standard	11 inches	36 square feet/unit	44 square feet/unit [a]
Bio Diffuser	High Capacity	16 inches	36 square feet/unit [b]	50 square feet/unit[c, d]
Bio-Diffuser	Bio 2	12 inches	28.8 square feet/unit [b]	28.8 square feet/unit[c, d]
Bio-Diffuser	Bio 3	12 inches	26.4 square feet/unit	43.2 square feet/unit
Bio-Diffuser	Bio 2	12 inches	28.8 square feet/unit[b]	28.8 square feet/unit[c, d]
Bio-Diffuser	ARC 18	12 inches	2.5 square feet/linear foot[b]	4.0 square feet/linear foot[c, d]
Bio-Diffuser	ARC 24	12 inches	3.7 square feet/linear foot	6.0 square feet/linear foot
Bio-Diffuser	ARC 36 Standard	12 inches	5.8 square feet/linear foot	7.0 square feet/linear foot
Bio-Diffuser	ARC 36 High Capacity (HC)	16 inches	5.8 square feet/linear foot	8.0 square feet/linear foot
Infiltrator	EQ 24	11 inches	33.3 square feet/unit [b]	33.3 square feet/unit[c,d]
Infiltrator	Quick4 EQ 24	11 inches	16.0 square feet/unit	16.0 square feet/unit [c,d]
Infiltrator	Quick4 EQ 24 LP	8 inches	10.8 square feet/unit	14 square feet/unit [c,d]
Infiltrator	Quick4 EQ 36	12 inches	14.8 square feet/unit	20.8 square feet/unit
Infiltrator	Standard	12 inches	36 square feet/unit	44 square feet/unit [a]
Infiltrator	Quick4 Standard	12 inches	23.2 square feet/unit	28 square feet/unit [a]
Infiltrator	High Capacity	16 inches	36 square feet/unit	50 square feet/unit [a]
Infiltrator	Quick4 High Capacity	16 inches	23.2 square feet/unit	32 square feet/unit [a]
Contactor	EZ-24	12 inches	16.5 square feet/unit	6.21 square feet/linear foot
Contactor 75	Contactor "C"	12 inches	36 square feet/unit	44 square feet/unit [e]

Contactor 100	100	12 inches	48 square feet/unit	57 square feet/unit
Contactor 125	125	18 inches	36 square feet/unit	50 square feet/unit [e]
Contactor	Recharger 180	20 inches	44 square feet/unit	63 square feet/unit
Contactor 375	Tripdrain	30 inches	64 square feet/unit	90 square feet/unit [e]
Contactor	Recharger 330	30 inches	65.25 square feet/unit	98.25 square feet/unit
Contactor	Recharger 400	32 inches	29 square feet/unit	57.6 square feet/linear foot
Contactor	Field Drain C1-C4	8 inches	57.8 square feet/unit	N/A
Infiltrator Quick 4 Plus [f]	**Without End Cap, Trench**	**Without End Cap, Cluster**		
Quick4 Plus High Capacity	8.0 square feet/linear foot	5.8 square feet/linear foot		
Quick 4 Plus Standard	7.0 square feet/linear foot	5.8 square feet/linear foot		
Quick 4 Plus Standard LP	7.0 square feet/linear foot	5.8 square feet/linear foot		
Quick 4 Plus Equalizer 36 LP	5.2 square feet/linear foot	3.7 square feet/linear foot		
Quick 4 Equalizer 24 LP	3.5 square feet/linear foot	2.7 square feet/linear foot		

[a] 36 inches from edge to edge (stone to stone, if stone is used).
[b] 12 inches from edge to edge on level systems (see manufacturer's installation guide).
[c] 18 inches, edge-to-edge, for single row trenches.
[d] 6 inches, edge to edge in 2 rows per trench with 36 inches between trenches.
[e] 6 feet from center to center, in trench configuration.
[f] Infiltrator Quick 4 notes:

1. Quick4 Plus All-in-One 12 Endcap installed at end of chamber row – 7.3 square feet/end cap or 14.6 square feet/pair of end caps.
2. Quick4 Plus All-in-One 12 Endcap installed midline in chamber row – 4.2 square feet/end cap.
3. Quick4 Plus All-in-One 8 Endcap installed at end of chamber row – 2.9 square feet/end cap or 5.8 square feet/pair of end caps.
4. Quick4 Plus All-in-One 8 Endcap installed mid-line in chamber row - 2.2 square feet/end cap.
5. Quick4 Plus 8 Endcap installed at end of chamber row - 1.0 square feet/end cap or 2.0 square feet/pair of end caps.
6. Quick 4 Equalizer 24 LP - 2.9 square feet/pair of end caps.

X. GRAVEL-LESS FABRIC WRAPPED DISPOSAL TUBING

1. Manufacturers: Manufacturers must be approved by the Department.

2. Configuration: Use of gravel-less fabric covered disposal field tubing is restricted to trench configurations.

3. Sizing: These devices have an effective disposal infiltration area of 5.0 square feet per linear foot.

TABLE 6C

Sizing for "GeoFlow" "Enviro-Septic" and "Infiltrator ATL" gravel-less disposal tubing

Device	Model	Configuration+	
		Cluster	Trench
GeoFlow	10 inches	N/A	5.0 square feet per linear foot
Enviro-Septic & Advanced Enviro-Septic	12 inches	N/A	5.0 square feet per linear foot
Infiltrator ATL System	12 inches	N/A	5.0 square feet per linear foot

Y. GEOTEXTILE SAND FILTERS

1. Manufacturers: Manufacturers must be approved by the Department.

2. Configuration: A minimum of 12 inches horizontal spacing must be maintained between all rows of geotextile sand filters.

3. Sizing: These devices have an effective disposal infiltration area of 12 square feet per linear foot.

TABLE 6D

Sizing for "Geotextile Sand Filter"
gravel-less cloth disposal system

Device	Model	Configuration	
		Cluster [b]	Trench [a]
GSF	Type A	24 square feet/ unit	24 square feet/unit
GSF	Type B	48 square feet/unit	48 square feet/unit

[a] 4 feet and 6 feet, center to center, type A units and type B units, respectively.
[b] A minimum of 12 inches of spacing between rows of GSF units for systems that have all the rows at the same elevation. Cluster installations that have rows that step down slopes of 15 percent or less shall have a minimum pacing of 12 inches between adjacent rows. Step down clustered installations on slopes of greater than 15 percent to 20 percent shall have a minimum spacing of 24 inches between adjacent rows.

Z. SYNTHETIC AGGREGATE CYLINDERS

1. Manufacturers: Manufacturers must be approved by the Department.

2. Sizing: These devices have an effective disposal infiltration area which varies as shown in Table 6E.

TABLE 6E Sizing for Synthetic Aggregate Cylinders

EZflow Model	Height	Configuration	
		Cluster	Trench
803H/ 803H GEO	8 inches	3.25 square feet per linear foot	4.0 square feet per linear foot
904H/ 904H GEO	9 inches	4.9 square feet per linear foot	6.0 square feet per linear foot
1201P/1201P GEO	12 inches	N/A	4.0 square feet per linear foot
1202H/1202H GEO	12 inches	5.36 square feet per linear foot	6.0 square feet per linear foot
1203H/1203H GEO	12 inches	6.4 square feet per linear foot	7.0 square feet per linear foot

AA. PRE-TREATMENT SAND FILTERS

1. Sand filters: Pre-treatment sand filters must be designed, installed and maintained in conformance with the guidelines set forth in the United States Environmental Protection Agency's Design Manual *On-site Wastewater Treatment and Disposal Systems*, EPA-625/1-80-012. The specific guidance Sections are:

(a) Intermittent sand filters: EPA-625/1-80-012 Section 6(C).

(b) Buried sand filters: EPA-625/1-80-012 Section 6(C).

(c) Free Access sand filters (Non-recirculating): EPA-625/1-80-012 Section 6(C).

(d) Re-circulating sand filter: EPA-625/1-80-012 Section 6(C).

BB. SEPTIC TANK FILTERS

1. General: Septic tank outlet filters perform two primary functions; retention of the solids in the tank and reduction of the BOD5. A potential purchaser is advised to obtain information pertaining to the recommended model, relative cost, availability, installation and maintenance procedures and flow rates from the manufacturer or distributor.

2. Manufacturers: Manufacturers must be approved by the Department.

CC. MECHANICAL REMEDIATION

1. Terralift and Terralift 2000. Terralift is a pneumatic device designed to restore onsite sewage disposal systems and improve systems of less than optimal performance, by creating a fractured soil condition adjacent to the disposal area into which effluent can drain, as well as fracturing the disposal area's bio-mat. Terralift is acceptable for use in the State of Maine on a conditional basis, provided that it is operated in conformance with stringent conditions relating to protection of ground and surface water supplies. The Department maintains a copy of these conditions.

DD. POST-SEPTIC TANK EFFLUENT FILTERS

1. FRICKle Filter: A multiple chamber, gravity flow filter device using anaerobic and aerobic processes as effluent flows through a serpentine series of baffles. Use of a FRICKle Filter in a replacement system is allowed a 20 percent reduction to the base design flow. Use of a FRICKle Filter in a first-time system may be assessed 10 points toward a First-Time System Variance, in accordance with Table 7M. http://albertfrick.com/.

2. Norweco Bio-kinetic BK-2000: The Norweco Bio-Kinetic Wastewater Management System BK 2000 (BK 2000) is a self-contained plate filter installed between a treatment tank and the point of final effluent disposal. The BK 2000 is allowed 20 points toward a First Time System Variance in accordance with Table 7M. http://www.norweco.com.

3. Puraflo Peat Biofilter: This product consists of manufactured, prepackaged peat filtration and treatment system modules. Installation of manufactured peat filtration modules do not require prior review and approval by the Department under Section 10(K)(4). First time system variance points may be claimed for use of the product in accordance with Table 7M. http://www.boradnamona.com.

4. Presby De-Nyte: The Presby De-Nyte consists of a molded plastic cell, with corrugations along the bottom and two sides. The cells are filled with a mixture of organic materials and mineral aggregates, and vented according to the manufacturer's directions. The Presby De-Nyte is designed for use with Presby Enviro-Septic systems exclusively. First time system variance points may be claimed for use of the product in accordance with Table 7M. http://www.presbyenvironmental.com/.

EE. UNDER-DRAINED PEAT FILTERS

1. Scope: Under-drained peat filters are designed to pre-treat septic tank effluent prior to its ultimate disposal in any disposal field authorized under these Rules.

2. Polyethylene liner: The under-drained peat filter is placed in an excavation or fill material that is lined with an 18 mil polyethylene sheeting or equivalent.

3. Final disposal in a disposal field: The effluent from the peat filter is conveyed to a separate disposal field for final disposal.

4. Sizing the disposal field: The disposal field used for final disposal is sized according to Sections 4(E) and 4(F) and sized at 90 percent of the minimum hydraulic loading rate required in Table 4D. Field size may be further reduced based on Table 4B.

FF. SUBSTITUTION OF PROPRIETARY DEVICES

1. The following proprietary devices may be substituted for one another without revisions to the permitted HHE-200 Form, unless specifically prohibited by notation of the licensed site evaluator. The bottom elevation(s) specified on the original HHE-200 form must be utilized with the substituted devices.

   (a) Concrete chambers: Any approved manufacturer's 4-foot-by-8-foot or 8-foot-by-8-foot chamber may be substituted for another approved manufacturer's 4-foot-by-8-foot or 8-foot-by-8-foot chamber, provided the original disposal area configuration is maintained.

   (b) Plastic chambers and other devices: Substitution of one approved device for another is permitted as noted in Table 6H. When the trench configuration is utilized, the number of trenches specified for the original design must be maintained with the substituted devices. When a device of a different length than the originally specified device is substituted, the minimum square footage specified on the original HHE-200 Form governs.

GG. DRIP IRRIGATION DISPOSAL

1. A drip irrigation disposal system receives effluent from a treatment tank and dispenses it to an infiltration system that is installed at a shallow depth in native or fill soil. The Department may require a layer of soil, mulch, or other engineered fill cover on the surface of the native soil, depending on wastewater quality delivered to the drip emitters.

2. All drip irrigation systems must be designed to prevent effluent ponding on the soil surface.

3. Application: Applications for drip irrigation systems must include the following provisions:

   (a) Advanced Treatment: Documentation the advanced treatment method proposed achieves the effluent criteria specified in Tables 6F and 6G , such as the type of advanced treatment system and the manufacturer's warranty;

   (b) Design Calculations: Design calculations, showing conformance with provisions of these Rules; and

   (c) Application (HHE-200 Form): An application completed in conformance with these Rules by a licensed Site Evaluator.

4. Drip irrigation disposal systems must be sized as follows:

   (a) Porous Hose System: A drip irrigation system utilizing porous hose must be sized pursuant to the specific product's approval granted by the Department.

(b) Drip Emitter System: A drip irrigation system utilizing manufactured drip emitters must be sized pursuant to the manufacturer's recommendations, as approved by the Department.

5. Drip irrigation systems must be installed in conformance with the following criteria:

(a) Separation from limiting factor: All drip irrigation lines must be installed at least 12 inches above the groundwater table or 24 inches above bedrock, whichever is more limiting. Backfill or mulch must be placed over the top of the porous hose in sufficient quantity and depth, as specified by the system supplier to prevent surface ponding of effluent.

(b) Separation from site features: All drip irrigation systems must be installed in conformance with horizontal setback requirements of these Rules.

(c) Line spacing: Drip irrigation lines must be placed at least 12 inches apart, unless variations in spacing allow preservation of existing trees and shrubs or enhance performance to overcome site limitations. The Site Evaluator shall note such variations on the application.

(d) Protection from freezing: Year-round drip irrigation systems must be installed with a minimum of 12 inches of suitable cover material to prevent freezing of the disposal area.

Table 6F Minimum Porous Hose Effluent Quality

Total Suspended Solids	10 milligrams per liter, 30-day arithmetic mean
Five Day Biochemical Oxygen Demand	10 milligrams per liter, 30-day arithmetic mean
Total nitrogen	53 milligrams per liter, five-month arithmetic mean
Total coliform	10 (Log 10) colony forming units per 100 milliliters

Table 6G Minimum Drip Emitter Effluent Quality

Total Suspended Solids	30 milligrams per liter, 30-day arithmetic mean
Five Day Biochemical Oxygen Demand	30 milligrams per liter, 30-day arithmetic mean
Total nitrogen	53 milligrams per liter, five-month arithmetic mean
Total coliform	100 (Log10) colony forming units per 100 milliliters

HH. NEW PRODUCT REGISTRATION

1. General: Any manufacturer or distributor submitting new products (including, but not limited to, remedial products, processes or devices, disposal system components, pre-filters or proprietary disposal devices) to the Department for code approval and registration must demonstrate that the conditions set forth in this Section are met. The Department shall maintain an updated list of subsurface wastewater related products approved for use in Maine.

2. Meets the intent of these Rules: The product is designed to protect public health, prevent the creation of any nuisance, and prevent environmental pollution to the same extent as comparable products presently authorized by the Department for use these Rules;

3. Sound engineering principles: The product is based on sound engineering principles and can be expected to provide the same level of protection to public health and the environment as offered by the authorized products presently authorized by the Department for use in these Rules. Sound engineering principles may be demonstrated by submitting a letter to the Department from a) a certifying organization, such as the Building Officials and Code Administrators (BOCA), or other suitable organization stating their approval of the product, or b) the American Society for Testing and Materials (ASTM) indicating the subject product (used as indicated in the request) meets the ASTM standard as specifically listed in the appropriate section of any nationally recognized code, such as BOCA or equal.

4. Registration: There are levels of approval for product registration: Pilot, Provisional, and General Use. All Pilot and Provisional product registration installations must be approved by the Department prior to installation.

   (a) Pilot approval: Pilot approval allows an applicant to demonstrate the general ability of a proposed product to treat wastewater as defined in the Rules, or perform other functions as claimed by the applicant. No less than 10 installations of a specific product registration must be granted Pilot approval by the Department. Pilot approvals must be limited to sites which do not otherwise require any variance or waiver to the Rules, if wastewater treatment is claimed by the applicant. If wastewater treatment is claimed by the applicant, on no less than a bi-weekly basis for a period of not less than six months, and once per month for at least an additional six months, the applicant shall test the influent and effluent of each installed product registration for the following parameters: five day Biochemical Oxygen Demand (BOD5), Total Suspended Solids (TSS), Nitrate Nitrogen (N03), Nitrite Nitrogen (NO2), Total Kjeldahl Nitrogen (TKN), Ammonia Nitrogen (NH4), and coliform bacteria. The results of these tests must be submitted to the Department on no less than a quarterly basis. Historic data from other jurisdictions may be submitted, if available. If such data are satisfactory, the applicant may bypass Pilot approval and proceed to Provisional status.

   (b) Provisional approval: Provisional approval allows an applicant to demonstrate ability of a proposed product to operate under a broader range of site conditions and to provide a larger number of data sources for such demonstration. No less than 50 installations of a specific new or experimental technology specific product registration must be granted Provisional system approval by the Department, of which 10 may be Pilot systems previously approved by the Department. Provisional product registrations must not be granted until the Pilot installations have been in operation for at least one year, or if historic data is accepted by the Department. Provisional product registration installations may include sites which require a variance or waiver to the Rules, with the provision that such variance or waivers are also subject to the standard variance requirements of the Rules, i.e., a passing point score for soils related variance, etc. If wastewater treatment is claimed by the applicant, on no less than a monthly basis for a period of not less than one year, the applicant shall test the influent and effluent of each installed provisionally approved product for the following parameters: five-day Biochemical Oxygen Demand (BOD5), Total Suspended Solids (TSS), Nitrate Nitrogen (N03), and coliform bacteria. The results of these tests must be submitted to the Department on no less than a semi-annual basis. Existing data from other jurisdictions may be submitted, if available. If such data are satisfactory, the applicant may bypass Provisional approval and proceed to General Use status.

   (c) General Use: To receive General Use approval for a product registration, the applicant shall demonstrate that the 50 installations allowed under Provisional approval have operated as designed and intended. Upon such demonstration, the provisionally approved product under consideration must be granted written General Use status approval for use in Maine, and must be included in the next revision of the Rules.

   (d) Advanced Wastewater Treatment Units and Effluent Filters: Advanced treatment units for treatment of wastewater as defined in these Rules, and septic tank effluent filters which have been certified by the National Sanitation Foundation (NSF), Canadian Standards Authority (CSA), or other third party testing entity are accepted by the Department for General Use in Maine, upon submission of such certification to the Department.

   (e) Other Criteria: The Department shall consider other relevant supporting data for product registrations on a case-by-case basis.

(e) Failure to perform: In the event that a product fails to perform as claimed by the applicant, use of the product in Maine, including all installations pursuant to this Section, must cease. Use of the product must not resume until the applicant and the Department reach a mutually acceptable agreement for resolving the failure to perform as claimed.

TABLE 6H - PERMITTED SUBSTITUTION OF PROPRIETARY DEVICES

		Bio-Diffuser									**Infiltrator**									**Contactor**				**Presby**		**Geo Flow**
		STD	16" HC	Bio 2	Bio 3	ARC 18	ARC 24	ARC 36 ST	ARC 36 H	ATL	EQ 24	STD	HC	Q4 EQ 24	Q4 STD	Q4 HC	PLUS STD	PLUS STD LP	PLUS EQ 36 LP	EZ 24	75	100	125	ES	ADV ES	
Bio-Diffuser	STD	X						X				X			X		X	X			X					
	16" HC		X						X				X			X							X			
	Bio2			X		X					X			X												
	Bio3				X		X																				
	AC 18			X		X					X			X												
	ARC 24				X		X																				
	ARC 36 STD	X						X				X			X		X	X			X					
	ARC 36 HC		X						X				X			X							X			
Infiltrator	ATL																							X	X	X
	EQ 24			X		X					X			X												
	STD	X						X				X			X		X	X			X					
	HC		X						X				X			X							X			
	Q4 EQ 24			X		X					X			X												
	Q4 STD	X						X				X			X		X	X			X					
	Q4 HC		X						X				X			X							X			
	Plus STD	X						X				X			X		X	X			X					
	Plus STD LP	X						X				X			X		X	X			X					
	Plus EQ LP				X		X												X							
Contactor	EZ 24																			X						
	75	X						X				X			X		X	X			X					
	100																									
	125																						X			
Presby	ES									X														X	X	X
	ADV ES									X														X	X	X
Geo-Flow										X														X	X	X

X = permissible

TABLE 6I
PLUMBING MATERIAL STANDARDS
FOR DISPOSAL SYSTEMS

ASTM NUMBER FOR PLASTIC PIPE MUST BE LATEST EDITION AS LISTED IN ANNUAL BOOK OF ASTM STANDARDS, PART 34

NOTES:

(A) PLASTIC PIPE MUST BE SLEEVED WHEN PASSING THROUGH MASONRY

(B) PERFORATED PIPE MUST BE USED WITHIN THE ACTUAL DISPOSAL FIELD

(C) WATER AND SEWER PIPE LESS THAN 10 FEET (CENTER TO CENTER) OR WATER AND SEWER PIPE IN THE SAME TRENCH REQUIRES THE WATER PIPE TO BE ON A SHELF AT LEAST 18 INCHES ABOVE AND 24 INCHES (CENTER TO CENTER) APART FROM EACH OTHER (HORIZONTAL MEASURE)

X = PERMISSIBLE

PRESSURE SEWER (OR PRESSURE LINE FROM PUMP CHAMBER TO DISPOSAL AREA)	EFFLUENT PIPE (LINE FROM TREATMENT TANK TO DISPOSAL FIELD FOOTPRINT)	DISTRIBUTION PIPE (PIPING WITHIN THE DISPOSAL FIELD FOOTPRINT) (SEE B)	BUILDING SEWER (WATER SERVICE IN SAME TRENCH) (SEE C)	BUILDING SEWER (SEPARATE FROM WATER SERVICE)	
x	x	x	x	x	ABS (ASTM D1527) Sch. 40, 80
x		x			ABS (ASTM D2282) SDR 13.5, 17, 21, 26
	x	x	x	x	ABS (ASTM D2661) DWV Sch. 40
	x	x		x	ABS (ASTM D2751, F810) Sewer Grade
			x	x	Cast Iron
				x	Concrete (ASTM C75, C200)
x		x		x	PB (ASTM D2662) Pipe SDR 7, 9, 11.5, 15
x	x	x			PE (ASTM D1248) Straight Wall
x		x		x	PE (ASTM D2239) Pipe SDR 5.3, 7,9, 11.5, 15, 19
x		x		x	PE (ASTM D2737) Tubing SDR 7.3, 9, 11
	x	x			PE (ASTM 3350) Smooth Wall Pipe, SDR 38, 35
x	x	x	x	x	PVC (ASTM D1785) Sch. 40, 80, 120
x		x		x	PVC (ASTM D2241) SDR 13.5, 17, 21, 26, 32.5, 41,64
	x	x	x	x	PVC (ASTM D2665) DWV Sch. 40
		x			PVC (ASTM D2629; F810) Thin Walled Perforated, Disposal Field Only
	x	x	x	x	PVC (ASTM D3034) SDR 23.5, 26, 35, 41

TABLE 6J
FRICTION LOSS IN SCHEDULE 40 PLASTIC PIPE
FEET OF HEAD LOSS PER 100 FEET OF PIPE

Flow	Pipe diameter in inches		
	1 ½ Inch	2 Inch	3 Inch
3 gpm	0.07 feet		
4 gpm	0.12 feet		
5 gpm	0.18 feet		
6 gpm	0.25 feet	0.07 feet	
7 gpm	0.36 feet	0.10 feet	
8 gpm	0.46 feet	0.14 feet	
9 gpm	0.58 feet	0.17 feet	
10 gpm	0.70 ft	0.21 feet	
11 gpm	0.84 feet	0.25 feet	
12 gpm	1.01 feet	0.30 feet	
13 gpm	1.17 feet	0.35 feet	
14 gpm	1.33 feet	0.39 feet	
15 gpm	1.45 feet	0.44 feet	0.07 feet
16 gpm	1.65 feet	0.50 feet	0.08 feet
17 gpm	1.86 feet	0.56 feet	0.09 feet
18 gpm	2.07 feet	0.62 feet	0.10 feet
19 gpm	2.28 feet	0.68 feet	0.11 feet
20 gpm	2.46 feet	0.74 feet	0.12 feet
25 gpm	3.75 feet	1.10 feet	0.16 feet
30 gpm	5.22 feet	1.54 feet	0.23 feet
35 gpm		2.05 feet	0.30 feet
40 gpm		2.62 fee	0.39 feet
45 gpm		3.27 feet	0.48 feet
50 gpm		3.98 feet	0.58 feet

TABLE 6K
HOLDING CAPACITY OF PIPES

Diamet	Pipe volume	
Inches	gallons/fo	length/gallon
1 ¼	0.0776	12 feet 10 5/8 inches
1 ½	0.1057	9 feet 5 ½ inches
2	0.1632	6 feet 1 ½ inches
2 ½	0.2549	3 feet 11 ¾ inches
3	0.3672	2 feet 8 ¾ inches
4	0.6528	1 foot 6 inches
5	1.0199	1 foot 0 inches
6	1.469	8 inches
7	1.999	6 inches
8	2.611	4 ½ inches

1 gallon of water = 8.35 pounds
1 cubic foot of water = 7.48 gallons