System Design

Klamath County requires a licensed Department of Environmental Quality (DEQ) installer with experience installing pressure distribution systems submit the design and hydraulic calculations. The retailers that sell pump system components can also help with design and hydraulic calculations.

- The drainfield trenches should be laid out in the same manner as an equal distribution standard drainfield. The trenches must be located in the Approved Area identified in the site evaluation report and should follow the natural contours of the native soil. There must be eight (8) feet of undisturbed soil between each trench.
- If laterals longer than seventy-five (75) feet are used, the transport manifold should run down the center of the drainfield.
- The lateral orifices must be evenly spaced, no more than twenty-four (24) inches apart in coarse textured soils or four (4) feet apart in finer textured soils.
- Determine the correct pump size to allow for a minimum five (5) foot squirt height from the remotest orifice with no more than 10% height variation throughout the system.

---

Oregon Administrative Rules (OAR 340-071-100 [148]) defines soil with rapid or very rapid permeability as any soil texture equal to or coarser than loamy sand or soils with more than 35% rock/gravel. Rapidly draining soils do not support the biological activity that occurs in the soil to remove pollutants from wastewater because the wastewater effluent drains so quickly.
# Total Dynamic Head and Design Flow Rate

Use the equations below to determine the required hydraulic calculations for level sites where all lateral piping is the same elevation. Sloping and complicated sites may require a consultant's calculations to verify uniform distribution throughout the system.

1. **HOW TO CALCULATE THE DESIGN FLOW RATE**
   \[ (N) \times (R) = \text{__________ gpm (design flow rate)} \]
   - **(N) Number of orifices:** Total number of (1/8) inch holes = ________
   - **(R) Discharge rate:** Discharge rate per (1/8) inch hole = ____0.43____ gpm

2. **HOW TO CALCULATE THE TOTAL DYNAMIC HEAD (TDH)**
   \[ (A) + (B) + (C) + (D) + (E) = \text{__________ feet (TDH)} \]
   - **(A) Static Head:** The elevation difference from the low water level in the tank (pump off) to the laterals = ________________ feet
   - **(B) Friction Head:** Length of transport pipe multiplied by friction loss (refer to manufacturer's tables) = ________________ feet
   - **(C) Discharge Assembly:** Refer to hose and valve assembly tables = ________________ feet
   - **(D) System Allowance:** Includes distribution piping losses and a residual head discharge at the distribution laterals of 5 feet. Generally, 10 feet is acceptable for this factor.
     = ________ 10 ________ feet
   - **(E) Other:** = ________________ feet

---

## Installation

1. Install the drainfield trenches using a transit or laser level to ensure the trenches are level. There should be no fall from one end of the trench to the other. The trench bottom should be at least twenty-four (24) inches wide. The trench depth is determined during the site evaluation process, is specific to each site, and is indicated in the installation permit. The maximum trench depth is measured from the native ground elevation to the bottom of the trench. It has been determined to be the most effective soil for the treatment of the wastewater, so it must not be exceeded.

2. Install at least six (6) inches of gravel at the base of the drainfield trenches. The gravel should be (3/4-2 1/2) inch river rock or crushed rock that has been sorted and washed.

---

*The Department of Environmental Quality (DEQ) keeps an updated list of approved drainfield products that may be used instead of pipe and rock. The list of approved products and their installation guides can be found at [https://www.oregon.gov/deq/Residential/Pages/Onsite-Products.aspx](https://www.oregon.gov/deq/Residential/Pages/Onsite-Products.aspx)*

*Please note that wire mesh with (1/2-1) inch openings should be placed below all gravel-less half pipes like Infiltrator Chamber.*
Installation Continued

5. Install pump in approved dosing tank. Adjust the alarm float (top float) so that the bracket center is two (2) inches below the invert of the tank’s outlet. The center bracket of the on float (middle float) should be set two (2) inches below the center bracket of the alarm float and the off float (bottom float) should be set so that no more than 20% of the permitted daily flow is pumped to the drainfield. **Inspection is required after this step.**

3. Install the pressure distribution laterals level with distraction orifices oriented downward and equipped with removable slotted-faced shields. One orifice at the end of each lateral should be oriented upward. Orifices may be drilled with a (1/8) inch burr-less bit. The distal end of each lateral should have a clean-out riser consisting of an approved long radium elbow riser or (2) 45 degree elbows.

4. The transport line to the drainfield may be (3/4 - 2) inches in diameter. Install it deep enough to be freeze protected. **Inspection is required after this step.**

6. Each drainline lateral must be covered with enough gravel to cover the orifice shields and equal a total depth of twelve (12) inches of gravel below and above the distribution laterals.

7. Each trench must be covered with filter fabric or untreated building paper before backfilling.

8. Carefully place backfill to prevent damage to the system. Backfill must be free of large stones, frozen clumps of earth, masonry, stumps, and waste construction materials.

9. Follow the inspection process for this installation! Two inspections are required during the process, and a final inspection is required once backfill is completed.

---

**Do not forget to set the bottom float to account for volume of effluent in transport piping (system design dependent)!**
Operation and Maintenance Requirements

Prior to the issuance of a pressure distribution installation permit, a copy of a maintenance agreement (contract) between the property owner and a DEQ certified maintenance provider is required to be submitted to the Klamath County Onsite Division.

For all pressure distribution systems permitted on or after January 1st, 2014, it is the responsibility of the pressure distribution system owner to maintain an ongoing contract with a maintenance provider for the life of the system [OAR 340-071-0290 (7)].

The maintenance provider is responsible for providing the following information to the Klamath County Onsite Division on the property owner’s behalf:

- An annual report that demonstrates the system has been properly maintained during the reporting year and is operating in accordance with the agent approved design specifications, or the owner has applied for a repair permit under OAR-340-071-0215;

- Payment of an annual report evaluation fee.

For more information about operation and maintenance of sand filter systems, check out the DEQ Sand Filter and Pressure Distribution Maintenance Fact Sheet, available online at: https://www.oregon.gov/deq/Residential/Pages/Onsite-Resources.aspx

Inspections

During the installation process, several inspections are required, as well as a final inspection. Please contact Klamath County Onsite Division to schedule these inspections. Call (541) 883-5121, Option#6 or visit our offices at 305 Main Street (Government Center) to schedule.

For your final inspection, please complete the Final Inspection Request Form (available online) and submit to the Klamath County Onsite Department in person or via mail or fax at 305 Main Street, Klamath Falls, Oregon 97601. You must include the materials list, the as built drawing, watertype test levels, and trench depths. Your inspector will arrive within seven (7) business days for the final inspection (upon receipt of the completed final inspection form).

Please ensure your inspector has access to the property; this includes securing livestock and dogs and making gates accessible.

Upon completed inspections, your inspector will contact you with the results. If you have any questions, you may contact our offices at (541) 883-5121, Option #6, Monday through Friday, 8 a.m. to 5 p.m.

This installation guide is designed to explain the basic workings of a pressure distribution system and the basic layout. For construction and material standards for all septic system types, refer to Oregon Administrative Rules (OAR) 340, Division 71 and 73, available online at: https://www.oregon.gov/deq/Residential/Pages/Onsite-Rules.aspx