

**TITLE 18. ENVIRONMENTAL QUALITY**  
**CHAPTER 9. WATER POLLUTION CONTROL**  
**PART E. TYPE 4 GENERAL PERMITS**

**R18-9-E322. 4.22 General Permit: Subsurface Drip Irrigation Disposal, Less Than 3000 Gallons Per Day Design Flow**

- A.** A 4.22 General Permit allows for the construction and use of a subsurface drip irrigation disposal works that receives high quality wastewater from an on-site wastewater treatment facility to dispense the wastewater to an irrigation system that is buried at a shallow depth in native soil. A 4.22 General Permit includes a pressure distribution system under R18-9-E304.
1. The subsurface drip irrigation disposal works is designed to disperse the treated wastewater into the soil under unsaturated conditions by pressure distribution and timed dosing. The applicant shall ensure that the pressure distribution system meets the requirements specified in R18-9-E304, and the Department shall consider whether the requirements of R18-9-E304 are met when processing the application under R18-9-A301(B).
  2. A subsurface drip irrigation disposal works reduces the downward percolation of wastewater by enhancing evapotranspiration to the atmosphere.
  3. An applicant may use a subsurface drip irrigation disposal works to overcome site constraints, such as high groundwater, shallow soils, slowly permeable soils, or highly permeable soils, or if water conservation is needed.
  4. The subsurface drip irrigation disposal works includes pipe, pressurization and dosing components, controls, and appurtenances to reliably deliver treated wastewater to driplines using supply and return manifold lines.
- B.** Performance. An applicant shall ensure that:
1. Treated wastewater that meets the following criteria is delivered to a subsurface drip irrigation disposal works:
    - a. Performance Category A.
      - i. TSS of 20 milligrams per liter, 30-day arithmetic mean;
      - ii. BOD<sub>5</sub> of 20 milligrams per liter, 30-day arithmetic mean;
      - iii. Total nitrogen (as nitrogen) of 53 milligrams per liter, five-month arithmetic mean; and
      - iv. Total coliform level of one colony forming unit per 100 milliliters, 95th percentile; or
    - b. Performance Category B.
      - i. TSS of 30 milligrams per liter, 30-day arithmetic mean;
      - ii. BOD<sub>5</sub> of 30 milligrams per liter, 30-day arithmetic mean;
      - iii. Total nitrogen (as nitrogen) of 53 milligrams per liter, five-month arithmetic mean; and
      - iv. Total coliform level of 300,000 (Log<sub>10</sub> 5.5) colony forming units per 100 milliliters, 95th percentile; and
  2. The subsurface drip irrigation works is designed to meet the following performance criteria:
    - a. Prevention of ponding on the land surface, and
    - b. Incorporation of a fail-safe wastewater control or operational process to prevent inadequately treated wastewater from being discharged.
- C.** Notice of Intent to Discharge. In addition to the Notice of Intent to Discharge requirements in R18-9-A301(B), R18-9-A309(B), and R18-9-E304, the applicant shall submit:
1. Documentation of the pretreatment method proposed to achieve the wastewater criteria specified in subsection (B)(1), such as the type of pretreatment system and the manufacturer's warranty;
  2. Initial filter and drip irrigation flushing settings;
  3. Site evapotranspiration calculations if used to reduce the size of the disposal works; and
  4. If supplemental irrigation water is introduced to the subsurface drip irrigation disposal works, an identification of the cross-connection controls, backflow controls, and supplemental water sources.
- D.** Design requirements. In addition to the applicable design requirements specified in R18-9-A312, an applicant shall ensure that:
1. The design requirements of R18-9-E304 are followed, except that:
    - a. The requirement for quick disconnects in R18-9-E304(D)(1)(c) is not applicable, and
    - b. The applicant may provide the reserve volume specified in R18-9-E304(D)(3)(a)(iv) in an oversized treatment tank or a supplemental storage tank;
  2. Drip irrigation components and appurtenances are properly placed.
    - a. Performance category A subsurface drip irrigation disposal works. The applicant shall ensure that:
      - i. Driplines and emitters are placed to prevent ponding on the land surface, and
      - ii. Cover material and placement depth follow manufacturer's requirements to prevent physical damage or ultraviolet degradation of components and appurtenances; or
    - b. Performance category B subsurface drip irrigation disposal works. The applicant shall ensure that:
      - i. Driplines and emitters are placed at least 6 inches below the surface of the native soil;
      - ii. A cover of soil or engineered fill is placed on the surface of the native soil to achieve a total emitter burial depth of at least 12 inches;
      - iii. Cover material and placement depth follow manufacturer's requirements to prevent physical damage or ultraviolet degradation of components and appurtenances; and
      - iv. The drip irrigation disposal works is not used for irrigating food crops;
  3. Wastewater is filtered upstream of the dripline emitters to remove particles 100 microns in size and larger;
  4. A pressure regulator is provided to limit the pressure of wastewater in the drip irrigation disposal works;
  5. Wastewater pipe meets the approved pressure rating in "Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120, D1785-04a (2004)," or "Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic

Pipe, Schedules 40 and 80, F441/F441M-02 (2002),” published by the American Society for Testing and Materials. This material is incorporated by reference and does not include any later amendments or editions of the incorporated material. Copies of the incorporated material are available for inspection at the Arizona Department of Environmental Quality, 1110 W. Washington, Phoenix, AZ 85007 or may be obtained from the American Society for Testing and Materials International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959;

6. The system design flushes the subsurface drip irrigation disposal works components with wastewater at a minimum velocity of 2 feet per second, unless the manufacturer’s manual and warranty specify another flushing practice. The applicant shall ensure that piping and appurtenances allow the wastewater to be pumped in a line flushing mode of operation with discharge returned to the treatment system headworks;
7. Air vacuum release valves are installed to prevent water and soil drawback into the emitters;
8. Driplines.
  - a. Driplines are placed from 12 to 24 inches apart unless other configurations are allowed by the manufacturer’s specifications;
  - b. Dripline installation and design requirements, including the allowable deflection, follow manufacturer’s requirements;
  - c. The maximum length of a single dripline follows manufacturer’s specifications to provide even distribution;
  - d. The dripline incorporates a herbicide to prevent root intrusion for at least 10 years;
  - e. The dripline incorporates a bactericide to reduce bacterial slime buildup;
  - f. Disinfection does not reduce the life of the bactericide or herbicide in the dripline;
  - g. Any return flow from a drip irrigation disposal works to the treatment works does not impair the treatment performance; and
  - h. When dripline installation is under subsection (E)(1)(b) or (c), backfill consists of the excavated soil or similar soil obtained from the site that is screened for removal of debris and rock larger than 1/2-inch;
9. Emitters.
  - a. Emitters are spaced no more than 2 feet apart, and
  - b. Emitters are designed to discharge from 0.5 to 1.5 gallons per hour;
10. A suitable backflow prevention system is installed if supplemental water for irrigation is introduced to the pumping system. The applicant shall not introduce supplemental water to the treatment works;
11. The drip irrigation disposal works is installed in soils classified as:
  - a. Sandy clay loam, clay loam, silty clay loam, or finer with weak platy structure or in soil with a percolation rate from 45 to 120 minutes per inch;
  - b. Sandy clay loam, clay loam, silty clay loam, or silt loam with massive structure or in soil with a percolation rate from 31 to 120 minutes per inch; and
  - c. Other soils if an appropriate site-specific SAR is determined;
12. The minimum vertical separation distances are 1/2 of those specified in R18-9-A312(E)(2) if the design evapotranspiration rate during the wettest 30-day period of the year is 50 percent or more of design flow, except that the applicant shall not use a minimum vertical separation distance less than 1 foot;
13. In areas where freezing occurs, the irrigation system is protected as recommended by the manufacturer;
14. If drip irrigation components are used for a disposal works using a shaded trench constructed in native soil, the following requirements are met:
  - a. The trench is between 12 and 24 inches wide;
  - b. The trench bottom is between 12 and 30 inches below the original grade of native soil and level to within 2 inches per 100 feet of length;
  - c. Two driplines are positioned in the bottom of the trench, not more than 4 inches from each sidewall;
  - d. The trench with the positioned driplines is filled to a depth of 6 to 10 inches with decomposed granite or C-33 sand or a mixture of both, with mixture composition, if applicable, and placement specified on the construction drawing;
  - e. A minimum of 8 inches of backfill is placed over the decomposed granite or C-33 sand fill to an elevation of 1 to 3 inches above the native soil finished grade;
  - f. Observation ports are placed at both ends of each shaded trench to confirm the saturated wastewater level during operation; and
  - g. A separation distance of 24 inches or more is maintained between the nearest sidewall of an adjacent trench; and
15. The soil absorption area used for design of a drip irrigation works is calculated using:
  - a. For a design that uses the shaded trench method described in subsection (D)(14), the bottom and sidewall area of the shaded trench not more than 4 square feet per linear foot of trench; or
  - b. For all other designs, the number of emitters times an area for each emitter where the emitter area is a square centered on each emitter with the side dimension equal to the emitter separation distance selected by the designer in accordance with R18-9-E322(D)(9)(a), excluding all areas of overlap of adjacent squares.
- E. Installation requirements.** In addition to the applicable requirements in R18-9-A313(A) and R18-9-E304, the applicant shall ensure that:
  1. The dripline is installed by:
    - a. A plow mechanism that cuts a furrow, dispenses pipe, and covers the dripline in one operation;
    - b. A trencher that digs a trench 4 inches wide or less;
    - c. Digging the trench with hand tools to minimize trench width and disruption to the native soil; or
    - d. Without trenching, removing surface vegetation, scarifying the soil parallel with the contours of the land surface, placing the pipe grid, and covering with fill material, unless prohibited in subsection (D)(2)(b)(ii);
  2. Drip irrigation pipe is stored to preserve the herbicidal and bactericidal characteristics of the pipe;

3. Pipe deflection conforms to the manufacturer's requirements and installation is completed without kinking to prevent flow restriction;
  4. A shaded trench drip irrigation disposal works is installed as specified in the design documents used for the Construction Authorization; and
  5. The pressure piping and electrical equipment are installed according to the Construction Authorization in R18-9-A301(D)(1)(c) and any local building codes.
- F.** Operation and maintenance requirements. In addition to the applicable requirements in R18-9-A313(B) and R18-9-E304, the permittee shall:
1. Test any fail-safe wastewater control or operational process quarterly to ensure proper operation to prevent discharge of inadequately treated wastewater, and
  2. Maintain the herbicidal and bacteriological capability of the drip irrigation disposal works.