

TITLE 18. ENVIRONMENTAL QUALITY
CHAPTER 9. WATER POLLUTION CONTROL
ARTICLE 3. AQUIFER PROTECTION PERMITS - GENERAL PERMITS
PART A. GENERAL PROVISIONS

R18-9-A312. Facility Design for Type 4 Onsite Wastewater Treatment Facilities

D. Soil absorption rate (SAR) and disposal works sizing.

1. An applicant shall determine the soil absorption area by dividing the design flow by the applicable soil absorption rate. If soil characterization and percolation test methods yield different SAR values or if multiple applications of the same approach yield different values, the designer of the disposal works shall use the lowest SAR value unless a higher SAR value is proposed and justified to the Department's satisfaction in the Notice of Intent to Discharge.
2. The SAR used to calculate disposal works size for systems described in R18-9-E302 is as follows:
 - a. The SAR by percolation testing as described in R18-9-A310(F) is determined as follows:

Percolation Rate from Percolation Test (minutes per inch)	SAR, Trench, Chamber, and Pit (gal/day/ft²)	SAR, Bed (gal/day/ft²)
Less than 1.00	A site-specific SAR is required	A site-specific SAR is required
1.00 to less than 3.00	1.20	0.93
3.00	1.10	0.73
4.00	1.00	0.67
5.00	0.90	0.60
7.00	0.75	0.50
10.0	0.63	0.42
15.0	0.50	0.33
20.0	0.44	0.29
25.0	0.40	0.27
30.0	0.36	0.24
35.0	0.33	0.22
40.0	0.31	0.21
45.0	0.29	0.20
50.0	0.28	0.19
55.0	0.27	0.18
55.0+ to 60.0	0.25	0.17
60.0+ to 120	0.20	0.13
Greater than 120	A site-specific SAR is required	A site-specific SAR is required

- b. The SAR using the soil evaluation method described in R18-9-A310(E) is determined by answering the questions in the following table. The questions are read in sequence starting with “A.” The first “yes” answer determines the SAR.

Sequence of Soil Characteristics Questions	SAR, Trench, Chamber, and Pit gal/day/ft ²	SAR, Bed gal/day/ft ²
A. Is the horizon gravelly coarse sand or coarser?	A site-specific SAR is required	A site-specific SAR is required
B. Is the structure of the horizon moderate or strongly platy?	A site-specific SAR is required	A site-specific SAR is required
C. Is the texture of the horizon sandy clay loam, clay loam, silty clay loam, or finer and the soil structure weak platy?	A site-specific SAR is required	A site-specific SAR is required
D. Is the moist consistency stronger than firm or any cemented class?	A site-specific SAR is required	A site-specific SAR is required
E. Is the texture sandy clay, clay, or silty clay of high clay content and the structure massive or weak?	A site-specific SAR is required	A site-specific SAR is required
F. Is the texture sandy clay loam, clay loam, silty clay loam, or silty loam and the structure massive?	A site-specific SAR is required	A site-specific SAR is required
G. Is the texture of the horizon loam or sandy loam and the structure massive?	0.20	0.13
H. Is the texture sandy clay, clay, or silty clay of low clay content and the structure moderate or strong?	0.20	0.13
I. Is the texture sandy clay loam, clay loam, or silty clay loam and the structure weak?	0.20	0.13
J. Is the texture sandy clay loam, clay loam, or silty clay loam and the structure moderate or strong?	0.40	0.27
K. Is the texture sandy loam, loam, or silty loam and the structure weak?	0.40	0.27
L. Is the texture sandy loam, loam, or silt loam and the structure moderate or strong?	0.60	0.40
M. Is the texture fine sand, very fine sand, loamy fine sand, or loamy very fine sand?	0.40	0.27
N. Is the texture loamy sand or sand?	0.80	0.53
O. Is the texture coarse sand?	1.20	A site-specific SAR is required

3. For an on-site wastewater treatment facility described in a general permit other than R18-9-E302, the SAR is dependent on the ability of the facility to reduce the level of TSS and BOD₅ and is calculated using the following formula:

$$SAR_a = \left[\left(\frac{1139}{\sqrt{TSS + BOD_5}} - 1.87 \right) SAR^{1.15} + 1 \right] SAR$$

- a. “SAR_a” is the adjusted soil absorption rate for disposal works design in gallons per day per square foot,
 - b. “TSS” is the total suspended solids in wastewater delivered to the disposal works in milligrams per liter,
 - c. “BOD₅” is the five-day biochemical oxygen demand of wastewater delivered to the disposal works in milligrams per liter, and
 - d. “SAR” is the soil absorption rate for septic tank effluent determined by the subsurface characterization method described in R18-9-A310.
4. An applicant shall ensure that the facility is designed so that the area of the intended installation is large enough to allow for construction of the facility and for future replacement or repair and is at least as large as the following:
- a. For a dwelling, a primary area for the disposal works sized according to subsection (D)(1) and a reserve area of 100 percent of the primary area, excluding the footprint of the treatment works. A reserve area is not required for a lot in a subdivision approved before 1974 if the lot conforms to its original approved configuration;
 - b. For other than a dwelling, a primary area for the disposal works sized according to subsection (D)(1) and a reserve area of 100 percent of the primary area, excluding the footprint of the treatment works.

5. An applicant shall ensure that the subsurface disposal works is designed to achieve the design flow established in R18-9-A309(B)(3) through proper hydraulic function, including conditions of seasonally cold and wet weather. that reduced setbacks are protective of human health or water quality.