

Percolation Test Procedure

The following procedure is a requirement in the San Diego County Local Agency Management Program (Section 4.3 and Appendix I-Percolation Test Procedures) and is used to evaluate percolation test results in a timely, uniform, and effective manner.

Obtain DEHQ Percolation Test Permit and Schedule Percolation Testing

- Review these test procedures to ensure testing is completed according to approved procedures. Complete the forms provided by DEHQ for permitting and recording testing results.
- Obtain a DEHQ Percolation Test Permit by completing the application provided by DEHQ and submitting with the associated permit fee.
- After the permit is issued, contact the assigned DEHQ staff to schedule the percolation testing inspection. Please provide at least 48 hours notice.
- For assistance call: (858) 565-5173 (Duty Desk) or contact: LWQDduty@sdcounty.ca.gov.

Preparation of Test Hole(s)

Test Hole(s) Dimensions: Diameter = 6 to 12 inches; Depth = Consistent with bottom of proposed dispersal field depth

- Describe test holes soils using the relative amount of sand, clay, silt, and combinations thereof as defined by the soil textural triangle found in the USDA Soil Survey Manual, Handbook 18.
- Scratch or score sides to remove any smeared soil surfaces. Remove loose material from hole. Add 2 inches of pea gravel to bottom of hole. A secure/stable perforated pipe may be used.
- Saturation: Presoak Test Hole(s) by adding a minimum of 12-14 inches of clear water for a minimum of four (4) hours. For **Clay Soils**, maintain 12-14 inches of water overnight. For highly permeable **Sandy Soils**, fill holes twice with 12-14 inches of clear water. If the water completely seeps away in less than 30 minutes, proceed to Case 2, Item 3.
- Begin test 15-30 hours after presoak.

CASE #1

Water remains in test hole after presoak/overnight

- Start Test: Adjust depth of water to six (6) inches above pea gravel.
- From a fixed reference point, take two (2) readings at thirty (30) minute intervals.
- Refill hole as needed between readings to maintain a six (6) inch column of water over the pea gravel.
- Calculate the test hole percolation rate in minutes per inch from the slowest water drop reading of the percolation test.

CASE #2

No water remains in hole when two water columns of 12-14 inches percolates in less than 30 minutes for each column

- Fill hole twice with 12-14 inches of water: if water percolates in less than 30 minutes, continue; if water remains in hole, proceed using Case #3.
- Resoak test hole for one hour if test is done day after initial presoak.
- Start Test: Refill hole to six (6) inches above the pea gravel at start of test and after each reading.
- From a fixed reference point, take readings ten (10) minutes apart over a four-hour period or until the rate “stabilizes” with the last two (2) rates not varying more than 1/16th inch.
- Calculate the test hole percolation rate using the last water drop reading.

CASE #3

No water remains in the test hole 15-30 hours after the four (4) hour presoak

- Presoak test hole with 6 inches of water for one hour to reestablish a wetted boundary.
- Start Test: Add water to depth of 6 inches above the pea gravel.
- From a fixed reference point, take readings thirty (30) minutes apart to the nearest 1/16 inch for four (4) hours.
- Refill hole as needed between readings to maintain a six (6) inch column of water over the pea gravel.
- Calculate the test hole percolation rate in minutes per inch using the last water drop reading.

Notes: 1) Measurements shall be reported to the slowest rate using the nearest 1/16th inch (or 0.1 inch). 2) The fixed reference point shall be a platform that is stable and represents the center of the test hole. 3) Water level detectors are encouraged and are required for test holes greater than 60 inches in depth. 4) See LAMP Section 4.3.13.2 for information on calculating the design percolation rate. 5) Calculation example: ¾ inch drop at 30 minutes = 30 divided by ¾ = 40 minutes per inch (MPI); or convert to tenth of inch: 3 divided by 4 = 0.75 inch; 30 minutes divided by 0.75 inch = 40 MPI. 6) See Capacity Test Procedures for vertical seepage pits.

Vertical Seepage Pit Capacity Test Procedure

The following procedure is a requirement in the San Diego County Local Agency Management Program (Section 4.3 and Appendix II-Vertical Seepage Pit Dispersal Systems Capacity Test Procedures) and is used to evaluate percolation test results in a timely, uniform, and effective manner.

Obtain DEHQ Percolation Test Permit and Schedule Percolation Testing

- Review these test procedures to ensure testing is completed according to approved procedures. Complete the forms provided by DEHQ for permitting and recording testing results.
- Obtain a DEHQ Percolation Test Permit by completing the application provided by DEHQ and submitting with the associated permit fee.
- After the permit is issued, contact the assigned DEHQ staff to schedule the groundwater reading inspection. Please provide at least 48 hours notice.
- For assistance call: (858) 565-5173 (Duty Desk) or contact: LWQDduty@sdcounty.ca.gov.

Preparation of Test Hole(s)

Test Hole(s) Dimensions: Diameter = 12 inch to 48 inches; Depth = Minimum 10'feet or 20 feet deeper (see note) than the bottom of proposed dispersal field

- Describe test holes soils using the relative amount of sand, clay, silt, and combinations thereof as defined by the soil textural triangle found in the USDA Soil Survey Manual, Handbook 18.
- The test hole shall be checked for the presence of groundwater a minimum of 24 hours after the installation of the boring to allow time for groundwater to stabilize in the hole.
- After the groundwater reading is recorded, the test hole shall be backfilled to either 10 feet or 20 feet above the bottom of the test hole or above the observed groundwater level, whichever is needed to meet the minimum required groundwater separation requirements.
- The boring shall be filled with water to the cap depth and a continuous presoak shall be maintained at the proposed cap level for a minimum 8-hour period. In highly permeable soil when cap levels cannot be maintained during presoak, the test shall be conducted at a depth no higher than the presoak level that was attained.
- Document the presoak attempt with gallons of water used. In no case shall less than 5,000 gallons of water be used within a 1-hour period in the attempted presoak when the cap level cannot be maintained. The depth of the test shall be noted on the boring log and in no case shall the sidewall of permeable soil below the cap level be less than 10 feet.

Determine Uniformity of Soil

- Upon completion of presoak, fill the boring to cap level and determine uniformity of soil by measuring the falling head.
- Measure depth to water level every 15 minutes or more frequently if needed, until the drop stops or the boring empties.
- A graph of the drop in water level over time shall be submitted with the results.
- If the testing shows a non-uniform/varying rate of drop over time, the soil is not considered uniform. The testing should be discontinued -the soils are not suitable for vertical seepage pit usage.
- If this procedure shows uniform soils, proceed with a two (2) hour static head or falling head capacity test.

Static Head

- The boring shall be filled with water to the cap and the water column shall be maintained at that level for two (2) hours.
- The amount of water added to maintain this level is documented.
- The 24-hour capacity test is determined by multiplying by 12. Adjustment to a 48-inch diameter pit is made when a smaller diameter test hole is used for testing.

Falling Head

- The boring shall be filled with water to the cap depth and the column of water shall be allowed to drop for a two (2) hour period.
- The distance dropped shall be measured and the amount of water absorbed determined.
- This amount is multiplied by 12 to determine the 24-hour capacity.
- Adjust to a 48-inch diameter boring when a smaller diameter test hole is used for testing.

Note: A minimum 20 foot separation to groundwater is required for soils with expected percolation rates of 5 MPI or faster.

Vertical Seepage Pits Guidance Information

Minimum Single Family Dwelling Septic Tank and Seepage Pit Absorptive Capacities (minimum per individual seepage pit capacity is 1,667 gallons per day)		
Number of Bedrooms Per Dwelling Unit	Minimum Tank Size Required	Minimum Total Absorptive Capacity Required (5x tank capacity)
1-3	1000 Gallons	5000 Gallons
4	1200 Gallons	6000 Gallons
5-6	1500 Gallons	7500 Gallons
7-8	2000 Gallons	10000 Gallons

Based on number of bedrooms (LAMP Tables 7.2-1 and 7.2-2)

Falling Head Test: Minimum Water Drop in Feet Needed Over 2-hour Test for Test Hole to Absorb						
Diameter of Test Hole	Volume per 1 ft depth (gallons)	1667 Gallons	5000 Gallons	6000 Gallons	7500 Gallons	10000 Gallons
4.0'	94.01	1.48'	4.43'	5.32'	6.65'	8.86'
3.5'	71.98	1.93'	5.79'	6.95'	8.68'	11.58'
3.0'	52.88	2.63'	7.88'	9.46'	11.82'	15.76'
2.0'	23.5	5.91'	17.73'	21.28'	26.60'	35.46'
1.0'	5.88	23.63'	70.86'	85.03'	106.29'	141.72'

Static Head Test: Minimum Volume in Gallons Needed Over 2-Hour Test for Test Hole to Absorb				
1667 Gallons	5000 Gallons	6000 Gallons	7500 Gallons	10000 Gallons
139	417	500	625	833

Falling Head Calculations

- Convert 2-hour test water drop in feet to volume in cubic feet.
 $3.142 \times \text{radius}^2 \times \text{height} = \text{Volume in Cubic feet (ft}^3\text{)}$
- Convert 2-hour test volume in cubic feet to volume in gallons.
 $\text{Volume (ft}^3\text{)} \times 7.48 \text{ gallons/ft}^3 = \text{Volume in Gallons}$
- Determine 24-hour test volume.
 $2\text{-Hour Test Volume} \times 12 = 24\text{-Hour Volume}$
- Adjust 24-hour test volume to a 4-foot diameter test hole (if needed). See Conversion Factor Table below.
 $24\text{-Hour Volume} \times \text{conversion factor} = 24\text{-Hour Volume for 4' diameter test hole}$

Example for a 30' water drop in a 3' diameter over a 2-hour test period:

- Convert to cubic feet: $3.142 \times (1.5 \text{ ft})^2 \times 30 \text{ ft} = 3.142 \times 2.25 \text{ ft}^2 \times 30 \text{ ft} = 212 \text{ ft}^3$
- Convert to gallons: $212 \text{ ft}^3 \times 7.48 \text{ gal/ft}^3 = 1586 \text{ gallons}$
- Convert to 24-hours: $1586 \times 12 = 19,032 \text{ gallons}$
- Adjust to 4-foot diameter test hole: $19,032 \text{ gallons} \times 1.33 = 25,313 \text{ gallons}$

Minimum Multiple Dwelling Septic Tank and Seepage Pit Absorptive Capacities (minimum per individual seepage pit capacity is 1,667 gallons per day)			
Primary Dwelling	Second Dwelling	Minimum Tank Size	Minimum Total Absorptive Capacity Required (5x tank capacity)
1 Bedroom	1 Bedroom	1000 Gallons	5000 Gallons
2 Bedrooms	1 Bedroom	1200 Gallons	6000 Gallons
2 Bedrooms	2 Bedrooms	1500 Gallons	7500 Gallons
3 Bedrooms	1 Bedrooms	1500 Gallons	7500 Gallons
3 Bedrooms	2 Bedrooms	1500 Gallons	7500 Gallons
4 Bedrooms	1 Bedrooms	1500 Gallons	7500 Gallons
4 Bedrooms	2 Bedrooms	2000 Gallons	10000 Gallons

Based on number of bedrooms (LAMP Tables 7.2-1 and 7.2-2)

Conversion to a 4' Diameter Test Hole

Measured 24-Hour Volume x Conversion Factor = Adjusted 24-Hour Volume

- Divide 4' by test hole diameter (x') = conversion factor (or use conversion factor from table)
- Multiply the measured volume by the conversion factor to get the final volume for a 4' diameter test hole

Example for a 3' diameter test hole with a measured volume of 19032 gallons:
 $4' \text{ diameter} \div 3' \text{ diameter} = 1.33 \text{ conversion factor}$
 $19032 \text{ gallons measured volume} \times 1.33 \text{ conversion factor} = 25,313 \text{ Gallons for 4' Diameter Test Hole}$

Conversion Factor Table		
From Diameter (ft)	To Diameter (ft)	Conversion Factor
1.0	4.0	4.0
2.0	4.0	2.0
3.0	4.0	1.33
3.5	4.0	1.14
4.0	4.0	1.0