

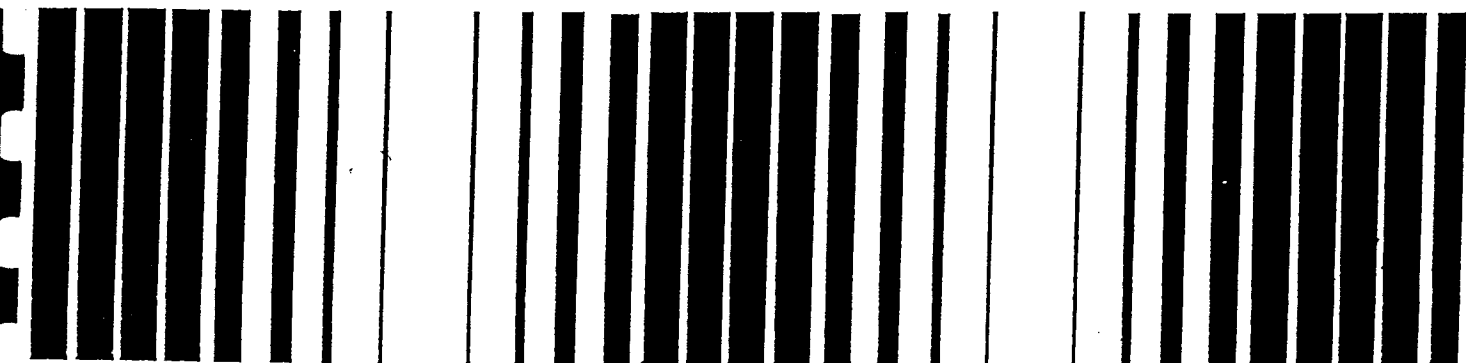
APPENDIX G
Recommendation for Hyper-Volatility

EPA

Manual

Bioventing Principles and Practice

Volume II: Bioventing Design



Manual

Principles and Practices of Bioventing
Volume II: Bioventing Design

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to manufacturer's specifications. All flow rates should be corrected to standard temperature and ambient pressure (altitude) conditions.

C.3.2 Soil Gas Permeability Test Procedures

This section describes the field procedures that will be used to gather data to determine k and to estimate R_L .

Before initiating the soil gas permeability test, the site should be examined for any wells (or other structures) that will not be used in the test but may serve as vertical conduits for gas flow. These should be sealed to prevent short-circuiting and to ensure the validity of the soil gas permeability test.

C.3.2.1 System Check

Before proceeding with this test, soil gas samples should be collected from the vent well, the background well, and all monitoring points, and analyzed for oxygen, carbon dioxide, and volatile hydrocarbons. After the blower system has been connected to the vent well and the power has been hooked up, a brief system check should be performed to ensure proper operation of the blower and the pressure and air flow gauges, and to measure an initial pressure response at each monitoring point. This test is essential to ensure that the proper range of manometric gauges is available for each monitoring point at the onset of the soil gas permeability test. Generally, a 10-minute to 15-minute period of air extraction or injection is sufficient to predict the magnitude of the pressure response and the ability of the blower to influence the test volume.

C.3.2.2 Soil Gas Permeability Test

After the system check, and when all monitoring point pressures have returned to zero, the soil gas permeability test should begin. Two people are required during the initial hour of this test. One person reads the manometric gauges, and the other person records pressure (P') versus time on the example data sheet. Designating one person for each test improves the consistency in reading the gauges and reduces confusion. Typically, the following test sequence is followed:

1. connect the manometric gauges to the top of each monitoring point with the stopcock opened. Return the gauges to zero.
2. Turn the blower unit on, and record the starting time to the nearest second.
3. At 1-minute intervals, record the pressure at each monitoring point, beginning at $t = 60$ s.
4. After 10 minutes, extend the interval to 2 minutes. Return to the blower unit, and record the pressure reading at the well head, the temperature readings, and the flow rate from the vent well.

5. After 20 minutes, measure P' at each monitoring point in 3-minute intervals. Continue to record all blower data at 3-minute intervals during the first hour of the test.

6. continue to record monitoring point pressure data at 3-minute intervals until the 3-minute change in P' is less than 0.1 in. of H_2O . At this time, a 5-minute to 20-minute interval can be used. Review data to ensure accurate data were collected during the first 20 minutes. If the quality of these data is in question, turn off the blower, allow all monitoring points to return to zero pressure, and restart the test.

7. Begin to measure pressure at any ground-water monitoring points that have been converted to monitoring points. Record all readings, including zero readings and the time of the measurement. Record all blower data at 30-minute intervals.

8. Once the interval of pressure data collection has increased, collect soil gas samples from monitoring points and the blower exhaust (if extraction system), and analyze for oxygen, carbon dioxide, and hydrocarbons. Continue to gather pressure data for 4 to 8 hours. The test normally continues until the outermost monitoring point with a pressure reading does not increase by more than 10 percent over a 1-hour interval.

9. calculate the values of k and R_L with the data from the completed test; use of the Hyperventilate computer program is recommended.

C.3.2.3 Soil Gas Monitoring After the Permeability Test

Immediately after completion of the permeability test, soil gas samples should be collected from the vent well, the background well, and all monitoring points, and analyzed for oxygen, carbon dioxide, and hydrocarbons. If the oxygen concentration in the vent well has increased by 5 percent or more, oxygen and carbon dioxide should be monitored in the vent well in a manner similar to that described for the monitoring points in the in situ respiration test. (Initial monitoring may be less frequent.) The monitoring should provide additional in situ respiration data for the site.

C.3.3 Quality Control

- Descriptions and dates of all of the above activities should be documented in study records.
- Soil analysis information should be included in the study records. Photographs should be taken periodically and retained with the study records.
- Records should be kept as indicated in this procedure and should be periodically reviewed by the study/task leader.