
40 C.F.R. § 796.2750

Sediment and soil adsorption isotherm.

(a) *Introduction* — (1) *Background and purpose.* The adsorption of chemicals to sediments and soils is an important process that affects a chemical's distribution in the environment. If a chemical is adsorbed to soil particles, it will remain on the soil surface and will not reach ground water. If a chemical is not adsorbed, it will leach through the soil profile and may reach ground waters and then surface waters. Similarly, if a chemical adsorbed to sediment, it will accumulate in the bed and suspended load of aquatic systems. If a chemical is not adsorbed to sediment, it will accumulate in the water column of aquatic systems. Information on the adsorption potential is needed under certain circumstances to assess the transport of chemicals in the environment. This section describes procedures that will enable sponsors to determine the adsorption isotherm of a chemical on sediments and soils.

(2) *Definitions and units.* (i) The “cation exchange capacity” (CEC) is the sum total of exchangeable cations that a sediment or soil can adsorb. The CEC is expressed in milliequivalents of negative charge per 100 grams (meq/100g) or milliequivalents of negative charge per gram (meq/g) of soil or sediment.

(ii) “Clay mineral analysis” is the estimation or determination of the kinds of clay-size minerals and the amount present in a sediment or soil.

(iii) “Organic matter” is the organic fraction of the sediment or soil; it includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the microbial population.

(iv) “Particle size analysis” is the determination of the various amounts of the different particle sizes in a sample (i.e., sand, silt, clay), usually by sedimentation, sieving, micrometry, or combinations of these methods. The names and diameter range commonly used in the United States are:

| Name | Diameter range |
|------------------|-------------------|
| Very coarse sand | 2.0 to 1.0 mm |
| Coarse sand | 1.0 to 0.5 mm |
| Medium sand | 0.5 to 0.25 mm |
| Fine sand | 0.25 to 0.125 mm |
| Very fine sand | 0.125 to 0.062 mm |
| Silt | 0.062 to 0.002 mm |
| Clay | <0.002 mm |

(v) The “pH” of a sediment or soil is the negative logarithm to the base ten of the hydrogen ion activity of the sediment or soil suspension. It is usually measured by a suitable sensing electrode coupled with a suitable reference electrode at a 1/1 solid/solution ratio by weight.

(vi) The adsorption ratio, “ K_d ,” is the amount of test chemical adsorbed by a sediment or soil (i.e., the solid phase) divided by the amount of test chemical in the solution phase, which is in equilibrium with the solid phase, at a fixed solid/solution ratio.

(vii) “Sediment” is the unconsolidated inorganic and organic material that is suspended in and being transported by surface water, or has settled out and has deposited into beds.

(viii) “Soil” is the unconsolidated mineral material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. Its formation and properties are determined by various factors such as parent material, climate, macro- and microorganisms, topography, and time.

(ix) “Soil aggregate” is the combination or arrangement of soil separates (sand, silt, clay) into secondary units. These units may be arranged in the soil profile in a distinctive characteristic pattern that can be classified according to size, shape, and degree of distinctness into classes, types, and grades.

(x) “Soil classification” is the systematic arrangement of soils into groups or categories. Broad groupings are based on general soil characteristics while subdivisions are based on more detailed differences in specific properties. The soil classification system used in this standard and the one used today in the United States is the 7th Approximation-Comprehensive System. The ranking of subdivisions under this system is: Order, Suborder, Great group, family, and series.

This document is only available to subscribers. Please log in or purchase access.

[Purchase Login](#)