1 Introduction to Wastewater Treatment and Process Analysis

WORKING TERMINOLOGY

Term	Definition
Batch reactor	A vessel in which flow is neither entering nor leaving during the reaction time.
Biosolids	Sludge from wastewater treatment processes that has been stabilized to meet the criteria in the U.S. EPA's 40 CFR 503 regulations and, therefore, can be used beneficially.
Complete-mix reactor (CMR)	A reactor in which complete mixing occurs instantaneously and uniformly throughout the reactor as fluid particles enter the reactor.
Characteristics, wastewater	General classes of wastewater constituents such as physical, chemical, and biological constituents.
Homogeneous reaction	Reactions that occur uniformly throughout the fluid so that the potential for reaction at any point within the fluid is the same.
Heterogeneous reaction	Reactions that occur between one or more constituents that can be identified with specific sites.
Ideal flow	A flow regime in which all fluid particles are retained in a reactor for a time period equivalent to the theoretical detention time.
Mass-balance analysis	An accounting of mass within a defined boundary before and after reactions and conversions have taken place.
Molecular diffusion, coefficient of	The movement of molecules from a region of higher concentration to a region of lower concentration.
Nonideal flow	A flow regime in which a portion of the fluid particles are held in a reactor for a time other than the theoretical detention time.
Plug-flow reactor (PFR)	A vessel intended to transport fluid particles such that they leave in the same sequence as they entered.
Reaction rate	The rate of change (decrease or increase) in the number of moles of a reactive substance per unit volume per unit time (for homogeneous reactions), or per unit surface area or mass per unit time (for heterogeneous reactions).