

Water Treatment Trainers

Educational Training Equipment for the 21st Century

Bulletin 651-8A

H-6518 Aerobic Digester

Purpose

The Hampden **Model H-6518** Aerobic Digester is a bench top trainer designed as a comprehensive study facility of biological water treatment processes. A synthetically prepared waste water is used to gain a working knowledge of the operational parameters and purification efficiencies.

Description

The Hampden **Model H-6518** Aerobic Digester consists of a 2 gallon reactor vessel mounted on a steel base, with a liquid feed pump, air supply, and instrumentation for monitoring and controlling the process.

The cylindrical wall of the reactor is made from 2 layers of porous plastic material to retain the suspended solids, while allowing treated water to pass through to the outer, annular exit chamber. This design allows the essential features of the aerobic treatment process to be studied without the distractions of having to settle the solids adequately enough for external recycle, a well known laboratory problem.

The porous liners are removable for cleaning, and a spare liner is supplied.

Waste water is drawn from a feed tank by a 120V motor driven peristaltic pump. Flow rate is controlled by a variable run time control that determines the minutes of run time within a 10 minute cycle. The pump delivers the feed to the reactor vessel through a transparent lid. Air is supplied at a measured rate by a small air pump, and discharges into the base of the reactor via an air distribution device. This provides the necessary oxygen for the digestion process, as well as produces sufficient bubbling for stirring and reaction. The liquid level in the reactor is maintained at a constant value of 1 or 2 gal. by an overflow device connected to the outer annular chamber of the vessel. Discharge is by gravity to a floor-standing product tank (not supplied).

The reactor temperature is maintained by a 3-term PID controller which varies power to an immersion heater within the vessel. Any temperature between ambient and 95°F may be selected, with the best conditions being a few degrees above the diurnal maximum in the user's laboratory.

Dissolved oxygen and pH probes and meters are included.

The reactor lid contains a gas exit port, suitable for sampling the gases for subsequent analysis.

Specifications

Feed pump

120V, peristaltic, 10 rpm, variable run time control corresponding to 0–13 gal. per day

Air pump

240V/120V, 0–1.35 gpm

Reactor vessel

2 gal. maximum capacity

pH meter

Range 0.00 to 14.00

Dissolved oxygen meter

Range 0–100% saturation, resolution 2%

Reactor heater

Electrical immersion 250W

Temperature controller

3-term PID, temperature limit set at 95°F

Experiments

- Acclimation of a completely mixed biological reactor
- Measurement of COD and MLSS changes as criteria of performance
- Establishing the stoichiometry and kinetics of aerobic biological processes
- Gas/liquid mass transfer
- Residence time distributions
- 100% scale up to industrial requirements
- Studying the effect on effluent quality of:
 - inflow substrate concentration (loading rate)
 - liquid flow rate and reactor volume (detention time)
 - air flow rate
 - temperature
 - pH stability
 - nutrient deficiency

Services Required

Electrical supply

120V-1Ø-60Hz



All Hampden units are available for operation at any voltage or frequency

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