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Wastewater Reclamation and Reuse

The Sheaffer Modular Reclamation and Reuse System provides several economic and environmental advantages to existing communities and new developments:

- Accommodates fluctuations in wastewater flow and loadings
- Operates without producing odors
- Minimizes sludge production
- Requires solids removal every 40 years or more
- Produces clear, clean, odor-free water for beneficial reuse
- Operates easily using simple, rugged components
- Reduces life cycle costs through efficient operations and maintenance
- Competes with capital costs of conventional systems
- Makes wastewater treatment an amenity, not an embarrassment

Sheaffer systems are composed of large reclamation cells made from compacted soils, and reclaimed wastewater is commonly reused for irrigation of croplands, golf courses, large lawns, and landscapes.

How does it work? The Sheaffer system uses a four-step process, which is described below:

Step One: Maceration

Maceration is another word for grinding. Incoming sanitary wastewater is passed through a comminutor to grind solids into small particles and maximize their surface area. This improves mixing and biodegradation. Comminutors are rugged, automatic units with bypass channels. Routine maintenance is limited to grinder motor servicing.

Step Two: Anaerobic and Aerobic Reclamation

Macerated wastewater flows by gravity through a buried pipe from the comminutor to the base of Cell I. This prevents wastewater from direct exposure to the air, and delivers the wastewater directly to an anaerobic zone at the base of Cell I. Biodegradation occurs within this oxygen free zone (typically 3 to 4 feet deep). Organic solids break down into constituent chemicals and compounds.

Air is introduced directly above this anaerobic zone to form a well-oxygenated column of water 12 to 20 feet deep. Air blowers installed at the top of the cell berm feed course bubble aerators. The odorous gases produced in the anaerobic zone are chemically transformed in the aerobic zone into non-odorous compounds.

Treated wastewater at the top of Cell I is transferred through a manhole and allowed to flow by gravity to the base of Cell II, where the anaerobic/aerobic process is repeated.

The reclamation cells are sized to provide a total of 14 days or more of detention time. This feature produces several benefits:

- Long detention times reduce the need for billions of bacteria to degrade wastewater. Treatment time is lengthened and sludge production is reduced.
- Large cells can readily accommodate fluctuations in wastewater flow and loadings.
- The large volumes in the anaerobic zone provide long-term storage capacity for solids which do not biodegrade, for example, sand and ground up plastic.
- Deep cells promote oxygen transfer efficiency

Step Three: Storage Reservoir

Reclaimed water from Cell II flows by gravity to a storage reservoir, where submerged aerators are used to keep the water mixed. The storage reservoir is sized for local climactic conditions to allow irrigation to be controlled to avoid inclement weather.

Step Four: Reuse of Reclaimed Water

Reclaimed water is most commonly reused for irrigation. Soils in potential irrigation areas need to be evaluated to locate acceptable areas. Typically, irrigation rates of 36 acre inches/acre/year are permitted by state agencies. This means that for every 100,000 gallons of design flow, 37 net acres of irrigation land are needed. In many communities, cropland is available nearby for this purpose. Sheaffer International has been successful in many cases in obtaining no-cost irrigation easements from cooperating landowners to allow irrigation on their land. This eliminates the need to purchase irrigation acreage, and allows local farm families to stay in farming and produce consistently high yields.