

## **THE FAST® SYSTEM**

FAST® stands for Fixed Activated Sludge Treatment. In the FAST® process, a colony of bacteria called the biomass breaks down biodegradable waste into carbon dioxide and water. The process occurs continuously as long as the biomass is supplied with food (incoming waste) and oxygen (air) in a suitable environment. Solid material that the biomass cannot process and bacteria that die settle in the bottom of the tank for normal pump-out removal.

The FAST® process consists of the treatment tank and the air pump (air source). The air pump provides continuous air to the treatment tank through the air supply pipe. The air supply pipe combines with the draft tube to create an airlift. This airlift is the means by which air and wastewater are mixed within the tank. The airlift assembly lifts the wastewater to the splash plate. The wastewater is cascaded off the splash plate across the surface of the honeycomb plastic media.

The honeycomb plastic media is the heart of the FAST® process and is suspended in the wastewater. The media contains the biomass, the colony of bacteria that stabilizes the wastewater. By growing on the honeycomb media and receiving food and air necessary for growth from the airlift, the biomass is allowed to eat (stabilize) the waste before it is discharged to the drain field or other dispersal site.

In a traditional septic tank and in some aerobic treatment systems, the biomass is allowed to suspend in the wastewater without the support and filter effect of a media. Therefore, the biomass has a greater opportunity to be discharged into a drain field.

The Fixed Activated Sludge Treatment system keeps the active biomass on the media and not in the water. This allows for cleaner water to be discharged to the drain field.

The vent pipe allows for venting of air and non-harmful carbon dioxide created by the process.

Eventually, as the biomass dies, sloughs off the media and collects at the bottom of the tank, the tank will need to be pumped out.

## **PROCESS DESCRIPTION**

The primary treatment zone (trash collector chamber) can be called the anaerobic zone and is the area from the inlet to the outlet leading to the main treatment zone. In this first zone, primary settling takes place. Heavy solids readily settle out. Most suspended solids in wastewater are "sticky" and flocculate naturally. The flocculation will aid the suspended solids in settling. In the primary treatment zone, there is no chemical coagulant usage or mechanical mixing to aid in flocculation. There is no type of skimmer in the primary zone to remove greases, oils or foam.

Several biological processes and physical operations take place in the aerobic zone of the FAST® system. The oxygen and food plus the circulation of the fluids allow biological cells to grow and attach themselves to the fixed media. Because of the wide variety of organics in the waste stream, a wide variety of organisms or a mixed culture biomass is formed. The most predominant biological reactions involve the degrading of organic matter such as proteins, carbohydrates and lipids to carbon dioxide. Once the biomass has established itself, several external factors may affect the rate of biomass reproduction and food utilization. The rate of biomass reproduction generally increases with increasing temperatures within the range of 0° C (32° F) to 32° C (90° F). The biological reaction rate increases with increasing temperatures. A rule of thumb, for this rate, is that the reaction rate will double every 10° C temperature increase up to a maximum temperature of 32° C.