

Structure and Function of Biogas Plant pdf



School Training Basics - IPPTS Associates

Structure and Function of a Biogas Plant

Introduction

This pdf document is for intended for young students. It is a short summary of the basics of the way in which biogas plants, which use the **anaerobic digestion** process, are structured.



It also explains in-brief how they perform their function of producing energy in the form of biogas (which is mostly methane gas).

The Structure and Function of a Biogas Plant Explained

The structure of a biogas plant is made up of large “digester” tanks, which are covered over with a flexible plastic membrane in which collects the biogas, and stores it until it is used.

Smaller tanks store the feed materials, and pumps move it around through pipes as needed.

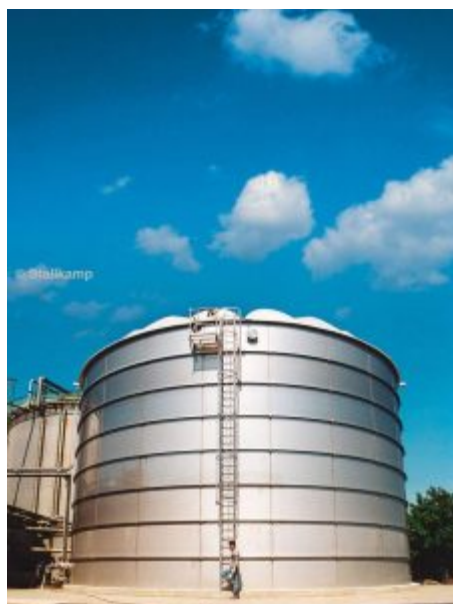
Structure and Function of Biogas Plant pdf



For the bigger biogas plants a control room is provided with a computer, and all the equipment needed to control the biogas process.

A flare is used to burn-off excess biogas, if there is too much of it at any time.

In a biogas plant, organic waste such as manure or **food waste** is mixed with water and in a receiving and mixing tank, large chunks are chopped-up until small particles.



Structure and Function of Biogas Plant pdf

One of Stallkamp's large stainless steel tanks.

While his mixture is inside the digester tank, being digested in the **anaerobic digestion** process. It is known as the substrate.

If there is a possibility that pathogens and other disease vectors will be present, the substrate is heated to **about** 70° for at least an hour, so no bacteria will be present in the ensuing digestion process.

From there, the substrate is pumped into an anaerobic digester (a large air-sealed tank or tanks) where it is digested for about a month.

After that period, from the digested mass is extracted. This includes, among other things, raw biogas which is then taken on to an upgrading plant and purified of its carbon dioxide content.



The gas (now called **biomethane**) can then be compressed and injected into the gas grid or be used at filling stations for gas-driven vehicles.

In the past instead of the “upgrading step”, the biogas would simply be used to power a large piston engine and generate electricity. Unfortunately, this is not very efficient, because a proportion of electricity tends to be lost in the power lines.

Structure and Function of Biogas Plant pdf



At least one third is lost that way.

In contrast to this, when a compressed biogas/ renewable natural gas cylinder is used as the fuel tank for a vehicle, there are very few inefficiencies, and much more of the biogas put into the system, actually reaches the place where it will perform a useful job.

The residual product (known as digestate) can now be thought of as a by-product drained of energy, but its is still full of active nutrients, and may be used as bio-fertilizer.

This can be used to grow new agricultural products – and thus the cycle is complete.