

ANAEROBIC DIGESTION

Historically, anaerobic digestion had been used at only municipal sewage treatment facilities. Today, anaerobic digestion is heavily used to treat wastes from distilleries, agriculture (e.g. dairy, swine, and poultry farms) breweries, food processing, and other industrial sites. Groth Corporation has the equipment and expertise to meet the needs of these as well as other industries. Whether you have an anaerobic digester, lagoon, covered pond, or landfill, Groth Corporation has the products and services to meet your needs from cover and gas control equipment to burners and flares.

Biogas Safety and Recovery Products

Groth Corporation has the products and services to meet your needs from cover and gas control equipment to burners and flares.

Groth Corporation is a global provider of high quality Biogas safety and recovery products.

Groth Corporation's Biogas products protect property and life from fire and explosion and reduce emissions into the atmosphere. When it comes to protecting property and life, accept nothing but the best.

Introduction

Groth Corporation offers a wide range of biogas safety and control equipment. Biogas is produced during the biological breakdown of organic solids through anaerobic digestion. The gas resulting from this process is an energy source that can be collected and utilized or safely burned. Recovered biogas can be used in many ways:

- Run generators to produce electricity
- Run boilers to heat the anaerobic digester or the treatment facility
- Used to eliminate natural gas and propane usage for cost savings and profit

Anaerobic digestion is a very safe and effective way of treating biosolids from municipal and industrial wastewater. It is ideal for meeting strict environmental regulations, especially with emission standards becoming more stringent in urban areas.



The anaerobic process takes place in digesters (closed tanks), covered ponds or lagoons by the use of a thermophilic or mesophilic process. Landfills also generate biogas naturally as buried organic refuse biodegrades.

The Biogas System

Biogas collection and utilization are important to the anaerobic digestion process. The gas is saturated and contains elements harmful to people as well as corrosive to piping and equipment. It is important for the biogas handling equipment to be of high quality and operate as a system.

Equipment



Moisture and Sediment

Biogas is saturated when it leaves the digester, covered pond or lagoon. In order to avoid damage to downstream equipment, moisture and sediment should be removed. A Condensate and Sediment Trap with drip trap should be located immediately downstream of the digester, covered pond or lagoon. A condensate accumulator should be considered when an accumulation of condensate is expected. This will help lower operating and maintenance costs.

Foam

Foam in the digester can clog gas handling equipment. The following is recommended to address this problem.

- Pressure and vacuum relief valves with flame arresters are installed on digester covers. When foam clogs the flame arresters, it may prevent the pressure and vacuum relief valves from properly relieving pressure or vacuum accumulation which could cause damage to digesters and the digester roof. Emergency pressure or vacuum relief can be accomplished by installing emergency relief valves.
- Installing a foam separator immediately downstream of the digester will prevent foam from entering the biogas stream downstream of the digesters.

Flames

Flame arresters should be installed between ignition sources and vital equipment. In addition, thermal shut-off valves should be used along with all in-line arresters. Flame arresters should be installed along with all pressure and vacuum relief valves on the digester roof to prevent external flames from igniting gas inside the tank.

Gas

Regulators will direct the gas to utilization equipment such as boilers and engine generators and may be located upstream or downstream depending on specifications. Check valves should be located where a reversal of flow would damage rotating equipment or disrupt the system's pressure balance. Biogas can become explosive within flammable concentrations of gas and air.

FLAME FLASHBACKS

Flame flashbacks can occur within the biogas piping system and can severely damage equipment.

Explosions



Specific equipment must be installed to prevent the possibility of explosion.

- Flame arresters must be installed as close to the source of ignition as possible.
 - A flame arrester should be installed by a source of air such as by relief valves and vents or where there is an open flame or chance of sparking.
 - Check local building codes, OSHA standards, and fire protection codes when determining where to locate waste gas burners or enclosed flares.
 - All vent lines should terminate outside the building when diaphragm-operated valves, manometers, and other equipment might vent gas when installed indoors.
- Pressure and vacuum relief valves, flame arresters, and drip traps should be inspected on a regular basis ensure proper operation and periodic maintenance is required to maximize efficient performance.

Emergency Relief

A biogas system should have two methods of relieving excess to the atmosphere:

Flares

- A waste gas burner is used to safely combust biogas and reduce odors

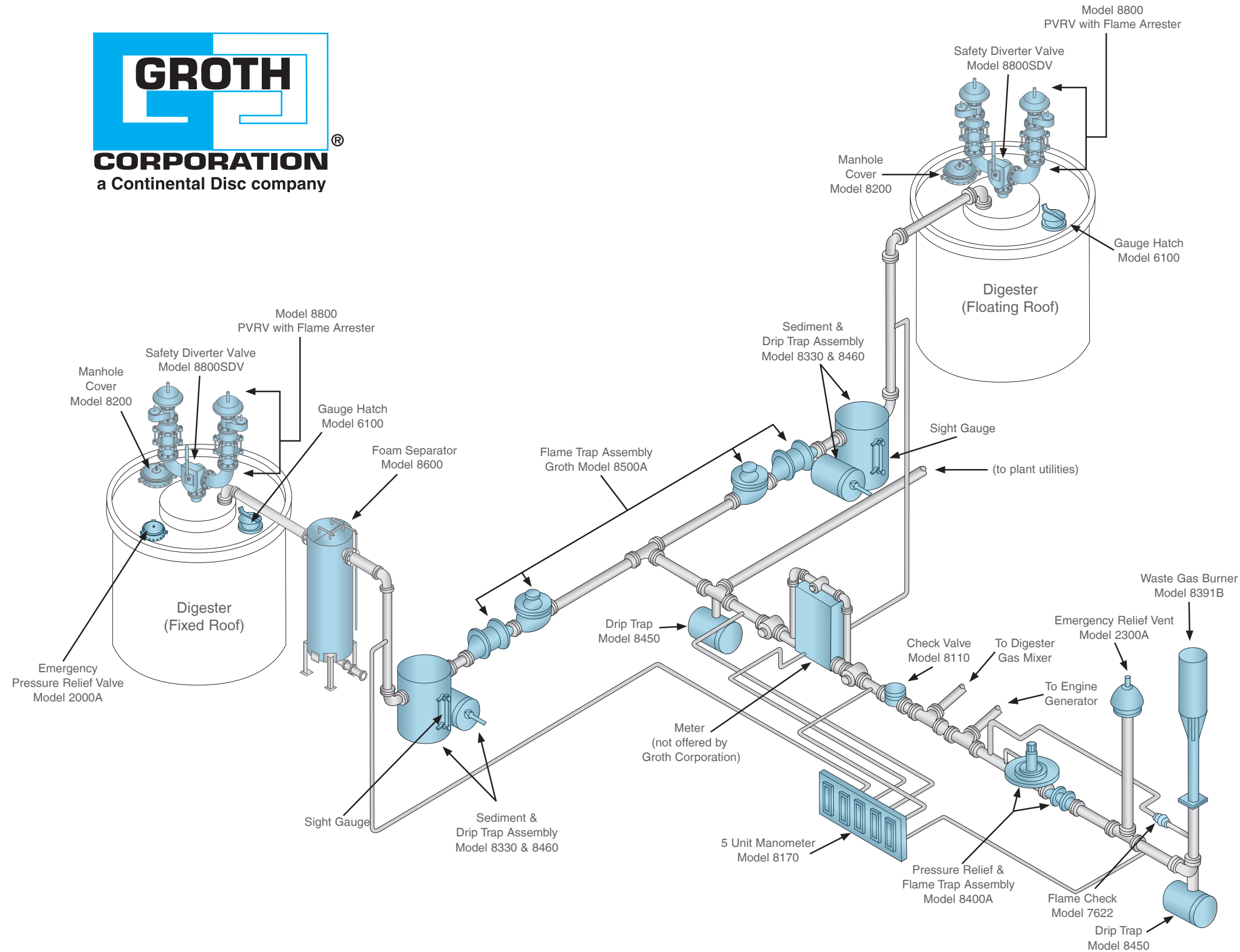
Pressure/Vacuum Relief Valves

- Pressure and vacuum relief valves should be installed on the digester cover or biogas holder. A minimum of two pressure/vacuum relief valves with flame arresters are recommended along with a Safety Selector Valve. The Safety Selector Valve enables isolating one set of equipment while performing maintenance on the other set.

TYPICAL FLOW AND INSTALLATION DIAGRAM SHOWING A MULTIPLE DIGESTER GAS SYSTEM



This schematic is for general presentation only and is not intended to represent a specific design.



Please consult the Groth Wastewater Biogas Catalog or www.grothcorp.com for complete information on listed products.

Field Service

Due to the safety hazards inherent with biogas, Groth Corporation provides field services to help ensure the safe and efficient operation of your biogas system.

Site Surveys

Groth Corporation experts will conduct a survey of your biogas system and report results regarding:

- System design
- Identify causes for existing operation problems
- Recommended solutions



Start-up and Training Services

Groth Corporation experts will assist with equipment start-up and conduct training on the proper care, operation and required preventive maintenance. This training is conducted in both the classroom and in the field and includes guidelines for future preventative maintenance to keep your biogas system operating smoothly and efficiently.

To learn more about Groth Corporation products and services, please contact the factory in Stafford, Texas or your local sales representative or visit us at www.grothcorp.com.

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