BIOFerm ™ Anaerobic Digester

FERMIGMA Plug Flow Technology

About BIOFerm Energy Systems

Based in Madison, Wisconsin, BIOFerm Energy Systems is an experienced provider of turnkey renewable energy systems, including anaerobic digestion, gas upgrading, and solar energy. From project conception to commissioning, optimization and training, BIOFerm handles every aspect of the entire process. Our range of biogas solutions allows for seamless integration into a variety of different operations, including landfills, municipalities, wastewater treatment plants, food processors, agricultural operations, and more. BIOFerm is committed to providing successful renewable energy projects to our clients and ensuring that our technologies will produce the results agreed upon by offering the industry's most thorough Performance Guarantee & Warranty.

System Overview

FERMIGMA is a horizontal plug flow digester that is designed for input materials with higher solids content. It has a rectangular footprint and a horizontal paddle mixer extending the tank's full length that is powered by drive units at both ends. This system is ideal for feedstock with a solids content of 12-25%.

Optional Expansions

The main function of FERMIGMA is to liquify (hydrolyze) the solid feedstock to provide a second-stage FERMADOR digester with broken down material. In this configuration, approximately 50% of the biogas produced occurs in the FERMIGMA and 50% occurs in the second-stage FERMADOR digesters. The FERMIGMA can also operate independently on smaller-scale projects.

System Specifics

- Heated horizontal paddle mixer ensures even temperature distribution
- Concrete coating in gas space protects concrete and reduces maintenance cost
- Robust feeder for individually tailored feedstock loading
- All technical equipment installed in one building
- Frost-proof and low-maintenance safety pressure relief valve

Key Features

- Ideal for feedstock with medium-high solids content
- Handles high organic load
- Specifically designed paddle mixers prevent settlement and allows continuous gas production
- Heating integrated into mixer shaft
- Low parasitic energy consumption
- Industry proven components
- Fully automated operation
- Operator-friendly control system
- Short construction time
- Scalable

BIOFermEnergy.com
info@biofermenergy.com
(608) 467-5523

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FERMIGMA Plug Flow Case Study

Akron Wastewater Treatment Plant
Akron, Ohio

As Phase I, KB Bioenergy constructed a FERMADOR & FERMIGMA anaerobic digestion system in 2007 to process wastewater sewage sludge from the city of Akron, Ohio's municipal treatment plant. This facility was built as a joint venture between the City of Akron and KB BioEnergy. In 2013, a Phase II expansion was added which allows the digesters to now process 100% of the facility's sewage sludge, generating additional renewable energy. Phase I handled about 7,000 dry tons of biosolids per year, and Phase II processes more than double that with 15,000 tons per year.

System Overview

PHASE I + PHASE II FERMIGMA Plant

- 3 FERMIGMA horizontal plug flow digesters (combined capacity of 696,000 gallons)
- 3 FERMADOR complete-mix digesters (combined capacity of 1,900,000 gallons)
- 1 All-in-One (AIO) technical container with a Jenbacher Type 2 J208 GS combined heat and power unit
- 3 additional 600 kW MWM engines

Financials

PHASE I: $7 million capital investment

- City investment of $835,000 funded by annual compost sales of $250,000
- $9.6 million federal renewable tax credit
- Remainder funded by KB Bioenergy

PHASE II: $32 million

Power & Energy Production

PHASE I

- 330 kW biogas engine
  - 330 kW electrical capacity
  - 395 kW thermal capacity
- Average annual energy production
  - 2,890 MWh electrical
  - 11,796 MMBTU thermal
- Estimated energy from the CHP could
  - Provide electricity to 256 homes/year
  - Heat 269 homes/year

PHASE II

- Additional 1.8 MW capacity (One 600 kW engine is on back up)
  - 1.2 MW additional electrical capacity
  - 1.3 MW additional thermal capacity
- Additional average annual energy production
  - 10,530 MWh electrical
  - 28,868 MMBTU thermal
- Additional estimated energy from the CHP could
  - Provide electricity to 932 homes/year
  - Heat 878 homes/year

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