Suite of products

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Marches Biogas Products

Technology offered by Marches Biogas

- Digester Design & Build for Municipal, Industrial, Agricultural and Food Waste settings
- Flexible Feed Systems
- Food waste processing & depackaging equipment
- Dynamic Digester Degrit System
- High Level Tank Protection
- Digester Mixing
- Foam Management Systems
- Digester Level Control through Pumped Discharge
- Double Membrane Gas Holders – Roof and Ground Mounted
- External Heat Exchangers
- Biogas cooling
- Biogas scrubbing
- Pasteurisation
- Secondary Digestion/Digestate Storage

Digesters – Design & Build

Marches Biogas provides a range of design and build services for new plant builds, extensions to existing anaerobic digestion facilities or the refurbishment of key plant components such as mixing, heating or feeding systems.

We provide solutions for all market sectors including municipal, industrial, food waste and agricultural. Each plant is designed based on the type and quantities of feedstock. We offer both a CSTR or our own semi plug flow technology. Together with the Glanua group we are able to offer full EPC wrap on design and build project.

Flexible Feed Systems

Marches Biogas design feed systems based on the type of feedstock proposed and the flexibility required for future feedstocks.

We use a variety of methods including pumped systems for liquid feedstock and walking/moving floor for solid feedstocks combined with screw augers. We can also combine both liquid and solid feed systems together in a hybrid system, while also allowing for the use of process liquors as part of the overall mix.

Food Waste Processing & Depackaging Equipment

Marches Biogas specialize in the depackaging and processing of food waste.

The feed system is designed based on the type of waste being received, whether that is domestic, commercial and industrial food waste together with the level and type of packaging being received.

High Level Tank Protection

Technical Overview:

An external overfill pipe with a level sensor provides a safe and controlled means of preventing overfilling in the anaerobic digester in a high level event, including rapid expansion, which could cause the gas pipework & pressure relief valves to become overwhelmed.

The pipe sits at liquid level and during normal operation sits at the same level as the contents of the digester. In a high level event, the liquid is forced to rise due to overpressure & discharge out of the pipe, protecting the integrity of the tank. The pipework contains a level sensor which would alarm should material make contact with the probe.

Advantages

- Prevents Overflows
- Provides a safe discharge route for excess material, protecting against digester overfilling and spillage

Early Warning System

- The level sensor detects high-level conditions and triggers alarms or automatic shutdowns before overflow occurs

Improved Safety

- Reduces risks of environmental contamination, gas release, and structural damage from over-pressurization

Integration and Control Systems

- Enables automated responses (e.g., stop feed pumps, close valves) for enhanced process safety

Digester De-grit System

Marches Biogas degrit system is designed to be used during the normal operation of any AD plant, helping to remove any settled grit from the process vessels and maintain operating capacity. The arrangement of the valving and pipework make it simple for operators to remove grit from their digesters on a regular basis, the frequency depending on how much grit it entering the digesters within their feedstock.

Digester Mixing

Marches Biogas use two types of mixing systems to ensure that the digester vessels are fully mixed preventing stratification. Gas mixing and hydraulic mixing are used, both are operated externally with no moving parts within the tank. This ensures that any maintenance can be safety carried out during normal operation with no requirement to decommission the process to access internal mixing components.

Gas Mixing

- Biogas is drawn from the digester and compressed.
- The compressed biogas is delivered to a rotary valve
- The rotary valve delivers biogas to only one or two nozzles at a time
- This encourages vigorous mixing in the area above and around that nozzle, blowing clear any grit build up
- The sequential operation of each nozzle prevents the preferential flow issues of unconfined gas mixing

Retro Fitting

- By replacing the top manifold of an existing gas mixing system with a rotary valve enhanced mixing can be achieved
- Powerful and reliable mixing will be delivered at each nozzle, although limited to the existing nozzle layout.

Hydraulic Mixing

- Digestate is transferred from a low level point within the digester via a centrifugal chopper pump and is pumped back into the digester at high, medium or low levels at various angles internally. This causes horizontal circulation in addition to disrupting the slurry in a vertical motion.

Retro Fitting

- **Easy maintenance** – All equipment is outside the digester, allowing quick access and servicing without tank entry or significant downtime.
- **Powerful, controllable mixing** – Pump-driven flow gives strong, adjustable circulation to keep solids suspended and prevent scum or sediment buildup.
- **Uniform process conditions** – Continuous mixing maintains consistent temperature, loading, and microbial activity throughout the digester.
- **Flexible and reliable design** – Simple to retrofit, suitable for many digester shapes, and free of moving parts inside the tank—reducing wear and corrosion.

Marches Biogas Mixing Technology Compared to Submersible Hydraulic Mixing

Parameter	Gas Mixing	External Hydraulic Mixing
Moving parts inside tank	None	None
Maintenance access	Excellent (all external)	Excellent (all external)
Mixing intensity	Strong	Moderate – Strong depending on tank dimensions
Mixing uniformity	Good for sludge suspension	Strong directional flow
Energy efficiency	Moderate	High (can be optimised)
Heat integration	Possible (with gas recirc loop)	Excellent (via recirculation through heat exchanger)
Risk of clogging	Low	Moderate
Cost	High CapEx, Low Opex due to compressors	Low CapEx, Low OpEx
Suitability	Ideal for all types of tanks	Favourable to smaller D:H ratio

Gas + External Hydraulic	Submersible Hydraulic Mixing
None	Yes
Excellent (all external)	Moderate (requires decommissioning or confined space entry)
Extremely Strong	Moderate, more stirring than mixing
Excellent — combines gas circulation with hydraulic flow	Good local mixing, less uniform in large tanks
High — hydraulic energy used more effectively due to gas assist	Moderate–High depending on combination agitators and mixers per digester.
Excellent (shared recirculation loop with heating)	Limited
Low–Moderate (gas helps reduce solids buildup)	High
High CapEx due to the combined costs of both mixing systems, Low OpEx	Moderate CapEx, High OpEx due to replacing of mixers and digester downtime
Ideal for all tanks	Favourable to smaller D:H ratio

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Foaming events, why they happen?

What it is?

A buildup of stable bubbles within the digestate caused by biogas becoming trapped in the sludge instead of escaping freely.

Why it happens?

Certain materials in the feedstock (fats, oils, proteins, detergents) act like natural soaps and stabilize bubbles. Rapid changes in feed composition, temperature, or loading rate can trigger foaming.

What problems it causes?

Reduces the digester's effective working volume. Can carry foam and liquid into gas lines, condensate pots, and other downstream equipment. Leads to blockages, loss of biogas flow, and potential damage to gas handling systems & process vessels. Makes process control and gas utilization difficult.

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Foam Management Products

Condensate Pot

A foam or condensate pot is a vessel installed on the biogas line, usually close to the digester. In normal operation it is designed to capture condensate from the biogas but it is also used to separate foam or liquid that gets carried over from the digester with the biogas, before reaching the biogas equipment.

- **Easy maintenance and monitoring** - Simple vessel with low-level and high-level switches, that can be drained an cleaned safely.
- **Prevents foam carry-over damage** - Stops foam and digestate from entering sensitive gas equipment (valves, meters, blowers, flare, CHP).
- **Provides early warning of digester foaming** - The high-level sensor alters operators and helps them to act before it becomes serious.
- **Easy to retrofit** – The foam pot is easy to retrofit and install. Existing biogas pipework can be altered with ease.

Roof Protection Systems

A RVE (Rapid Volume Expansion) protection system is designed to manage sudden increases in digester volume.

The system works in several coordinated steps:

- **Continuous Monitoring:** Multiple level probes track liquid or sludge levels in real time. They detect rapid rises in volume before the digeser reaches a critical level.
- **Automatic Response:** When the probes detect rapid expansion, the system can automatically activate control measures such as stopping feed pumps, diverting digestate, or adjusting gas management devices.
- **Overflow and Relief Management:** External overfill foam box & ultimate relief devices provide safe outlets for foam, preventing spillage or overpressure inside the digester.
- **Gas Over & Under Pressure Control:** Sudden gas pressure changes are safely relieved through vacuum pressure relief valves preventing damage to vessel structure.
- **Operator Alerts:** Alarms notify operators of high levels or rapid changes, allowing timely intervention if needed.

NOTE: This does not prevent RVE. It is a mitigation system to reduce the consequences of RVE.

What is a UPRV system?

An Ultimate Pressure Relief Valve (UPRV)

The UPRV is a safety feature installed directly on the anaerobic digester to protect against overpressure as a final safeguard.

Under normal operation, the valve remains sealed, maintaining digester integrity. If there is a build up of foam & pressure beneath the valve moving up into the gas headspace, the valve lifts and allows the controlled release of foam, preventing structural damage or rupture.

The valve uses a counterweight to determine the opening pressure and reseals automatically once the foam subsides. This mechanism provides ultimate overpressure protection, ensures safe operation, and serves as a fail-safe for the digester.

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Advantages of the Roof Safety System

Structural Safety

- Prevents over & under-pressurisation of the digester tank and roof.
- Reduces the risk of mechanical damage or rupture, extending tank life

Process Stability

- Sudden expansion often indicates rapid gas production or foaming events
- Protection systems help maintain stable conditions by managing the physical side effects and avoiding disruption to microbial activity

Controlled Gas Management

- Ensures that excess gas is safely captured, reducing hazards from uncontrolled release.
- Protects downstream equipment such as pipes, valves and biogas consumers

Improved Reliability

- Helps the digester operate continuously without emergency shutdowns, maintaining consistent biogas production

Regulatory Compliance

- Avoiding uncontrolled gas release or spillage ensures compliance with environmental and safety regulations

Digester Positive Level Control

Sludge digesters often have overflow weirs fed by a pipe from the digester at multiple points. The digestate then is discharged from the weir via gravity flow as no image shown. Common Issues due to this method of digester discharge are as follows:

Stratification

- The formation of distinct layers within a tank or vessel because the contents aren't well mixed can be exacerbated by the removal of more liquid digestate, slowly increasing the dry matter of the digester contents

Gas Entrapment and Hydraulic Surging

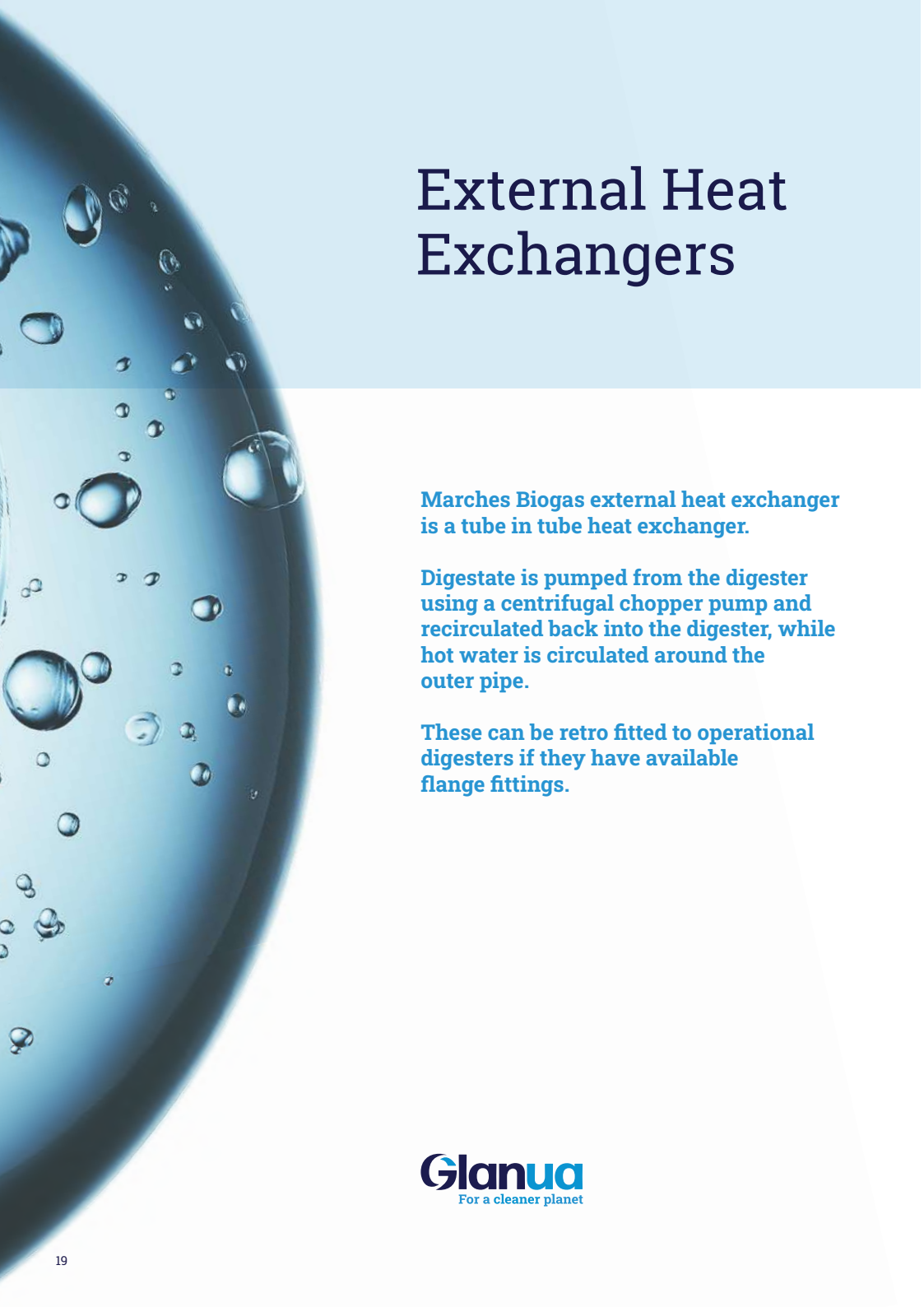
- Biogas is released from the digestate that is left unmixed within the discharge pipe which in turn reduces the specific gravity (SG) and level within the pipe, compared to the SG and level within the digester. In a gravity-overflow weir box, this leads to intermittent surges or slugs of flow which can result in erratic discharge rates, foaming and inaccurate flow control.
- Result: erratic discharge rates, foaming, and inaccurate flow control

The Solution - Pumped Discharge

- The digester overflow pipe is connected onto a pump
- The pump runs on a set timer (as long as the digester levelsare healthy).
- This assisted discharge also encourages grit to be pulled out of the digester with the digestate being pulled out from the base of the digester

The Solution - Air Injection

- To assist in the overflow of the digester takeoff, an air compressor can be installed into the overflow pipe at ground level. This lowers the density of the digestate, bringing it back inline within the digester SG
- The air is then released out of the digestate in the weir box allowing the digestate to return to its normal density. This has been installed successfully at a number of sites within the UK



External Heat Exchangers

Marches Biogas external heat exchanger is a tube in tube heat exchanger.

Digestate is pumped from the digester using a centrifugal chopper pump and recirculated back into the digester, while hot water is circulated around the outer pipe.

These can be retro fitted to operational digesters if they have available flange fittings.

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Advantages

Easier maintenance and access

- Equipment is located outside the digester, so it can be cleaned, inspected, or replaced without draining or opening the tank
- Reduces downtime and maintenance costs

Improved temperature control

- External circulation allows precise adjustment of heating rates and digest temperature.
- Combined with the Marches Biogas mixing systems it provides more even heat distribution, reducing cold spots or local overheating.

Higher heating efficiency

- Better heat transfer performance than in-tank coils, using energy more efficiently.

Enhanced process stability

- Recirculation through the heat exchanger helps mix the digestate, maintaining uniform conditions and supporting steady biological activity.

Flexibility and safety

- External systems are easier to retrofit or upgrade.
- Keep all hot surfaces outside the digester, reducing risks of corrosion, leaks, or damage inside the tank.

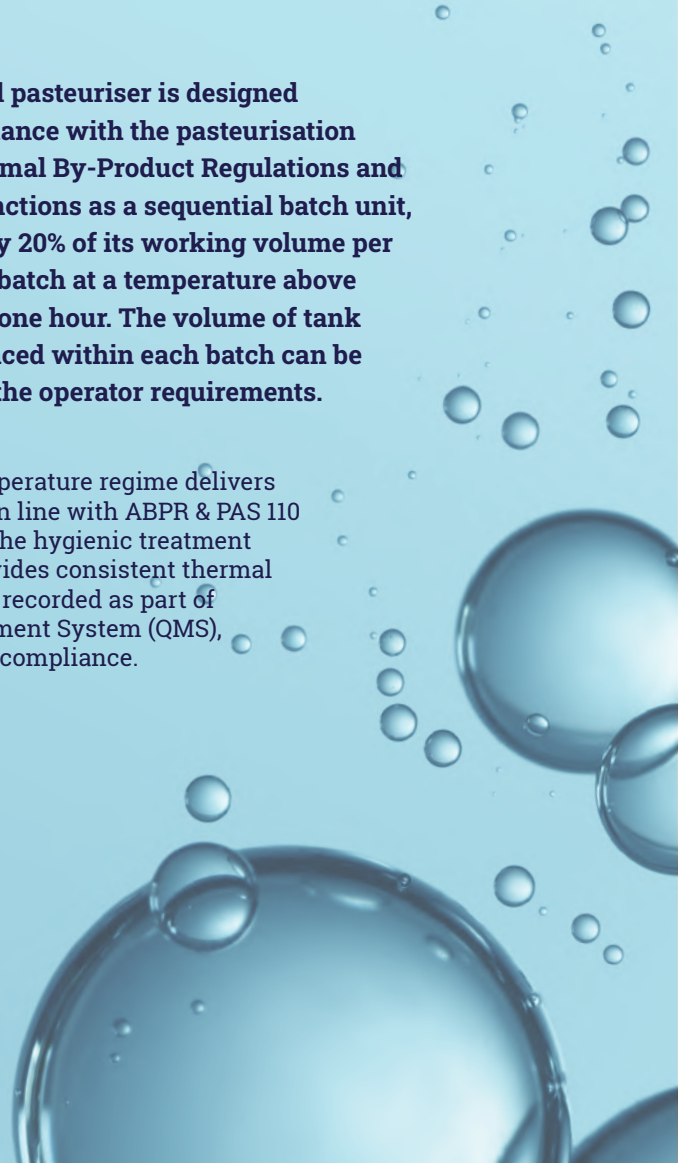
Self Cleaning

- Due to the velocity of the chopper pump, the digestate is pumped through the heat exchanger at its scouring velocity allowing solids to always be in suspension

Pasteurisation

The Marches sequential pasteuriser is designed to operate in full compliance with the pasteurisation requirements of the Animal By-Product Regulations and PAS 110. The system functions as a sequential batch unit, receiving approximately 20% of its working volume per cycle and holding each batch at a temperature above 70 °C for a minimum of one hour. The volume of tank to be removed and replaced within each batch can be changed depending on the operator requirements.

This controlled time–temperature regime delivers validated pasteurisation in line with ABPR & PAS 110 process expectations for the hygienic treatment of digestate. The unit provides consistent thermal treatment, monitored and recorded as part of the site's Quality Management System (QMS), supporting demonstrable compliance.



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Advantages

Stable temperature control

- Majority of the volume remains hot between cycles, so the unit reaches and maintains target pasteurisation temperature quickly and consistently

Energy efficiency

- Retaining majority of the heated material minimises reheating demand and levels out heat demand overtime

Smooth, continuous operation

- Frequent small discharges and refills create a near-continuous process, proving throughput and reducing downtime between batches

Consistent product quality and pathogen kill

- Reduced temperature swings ensure all material meets the required pasteurisation conditions, enhancing process reliability

Lower thermal and mechanical stress on equipment

- Smaller temperature fluctuations extend the life of tanks, seals, and heating components

Operational flexibility

- Easier to scale feed and discharge rates to match digester loading or variable feedstock supply without full shutdowns

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Digestate Storage Tank Covering

Digestate within a storage tank is likely to emit some methane and odours to atmosphere if left uncovered, representing both an environmental and operational challenge.

Installing a double-membrane gas cover allows safe capture and storage of biogas, enabling energy recovery and reducing greenhouse gas emissions. The flexible membrane protects the tank structure, manages pressure fluctuations, and requires minimal maintenance. Overall, this solution delivers environmental, operational, and economic benefits, supporting regulatory compliance, improving public perception, and enhancing the sustainability of the facility.

Advantages

Flexible gas storage

- Expands and contracts with biogas production, handling variable volumes safely

Easy to retrofit

- Simple and easy to fit to existing storage tank with installation of addition panel for bolting if required

Leak and odor reduction

- High-quality membranes minimize biogas loss and emissions

Visual gas monitoring

- Level instruments provides an easy indicator of gas volume

Double Membrane Floor Mounted Biogas Holder

Marches Biogas can replace or retrofit floor mounted biogas holders. We can carry out the sizing, design, supply, installation and commissioning of the biogas holders into the existing biogas system taking it from the biogas producers to the biogas users. Where needed we can add gas chillers and carbon scrubbers, depending on the characteristics of the biogas and the requirement of the users.

The double membrane biogas holders are fitted with over pressure protection, gas detection systems (to alert for leaks within the inner membrane) and level control to automatically manage the operation of gas consumers with biogas production. They are easy to operate and maintain.

Flares

Marches Biogas design and supply gas flare systems (surplus gas burners) within any biogas system.

These would be compliant with all environmental regulations and would be sized appropriately to the biogas installation. Marches Biogas is able to offer regular flare servicing to ensure that they are fully operational at the moments they are required.

Seperators

Marches Biogas supplies digestate separators which would be fully designed, installed and commissioned into the digestate pipework system.

The type of separator selected would depend upon the characteristics of the digestate and level of separation required. The separator would have dry run protection and be controlled automatically with the digester discharge system.

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Our commitment as a complete solutions provider

At Glanua, we are dedicated to transforming water and wastewater infrastructure with technical excellence, environmental stewardship and innovative thinking to build a cleaner planet.

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Glanua, a complete solution provider of water, wastewater and bioresource innovations

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