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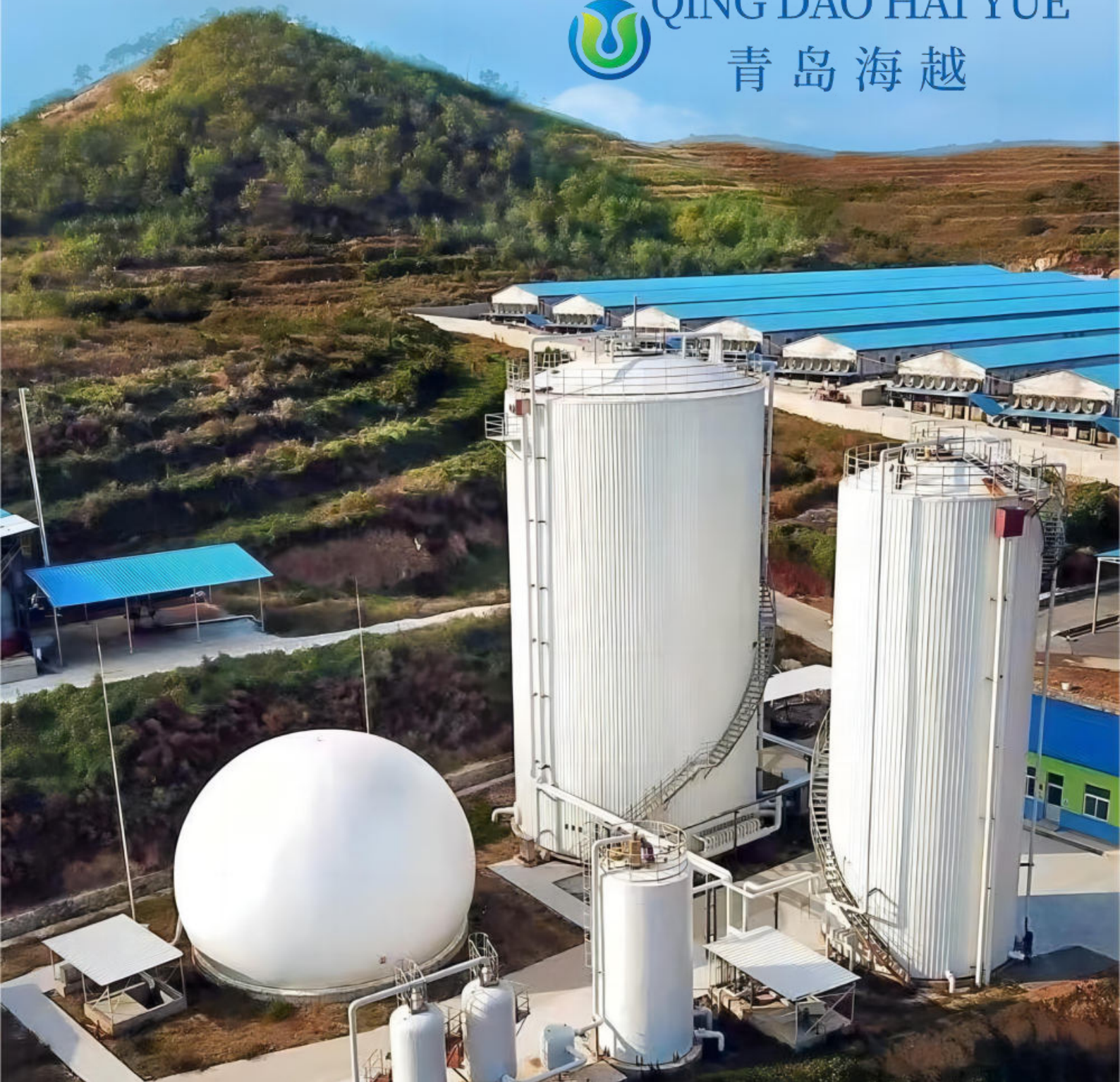
高新技术企业

BIOGAS SOLUTIONS



QING DAO HAI YUE

青岛海越



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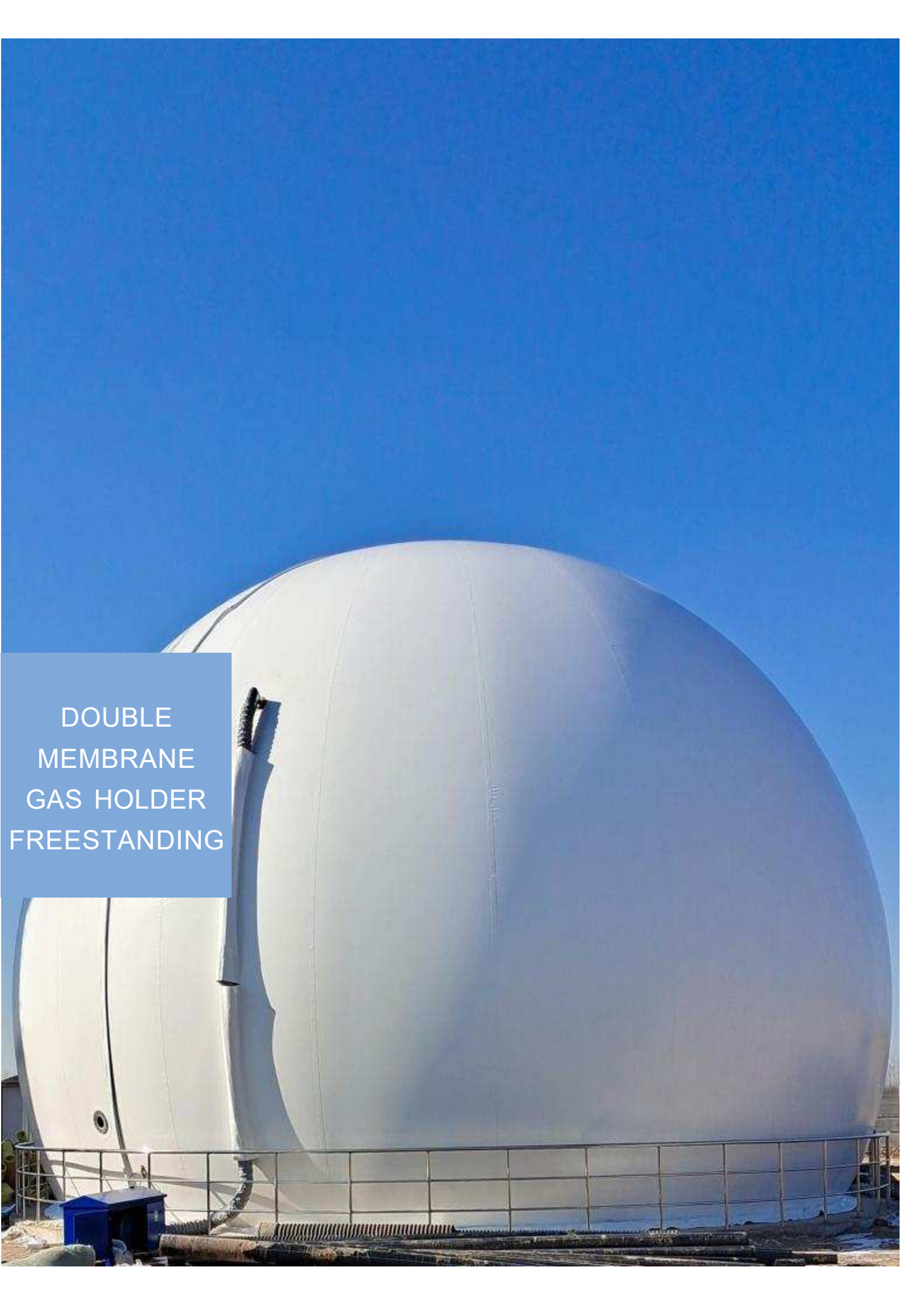
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QINGDAO HAIYUE MEMBRANE STRUCTURE CO. , LTD

Qingdao Haiyue is located in Qingdao, China. Qingdao Haiyue began to develop and design complete sets of equipment such as double membrane gas holder, enamel assembly anaerobic tower, biogas purification, biogas flare and so on. Accumulated more than 15 years of industry experience, more than 3,000 global engineering cases. To establish safety, innovation, coordination, open, green, quality, service, win-win for the development concept. Involving municipal sludge, restaurant kitchen waste, municipal solid waste, industrial waste water, agricultural biomass, and a variety of high concentration of organic pollutants, the use of anaerobic fermentation technology, which is the most important treatment process of biogas engineering.

More and more biogas is collected and used up, the common forms of flare combustion, biogas boiler, combined heat and power generation, purification after grid connection or used for vehicle gas and other forms, has become the international first-class environmental protection engineering overall solutions supplier.



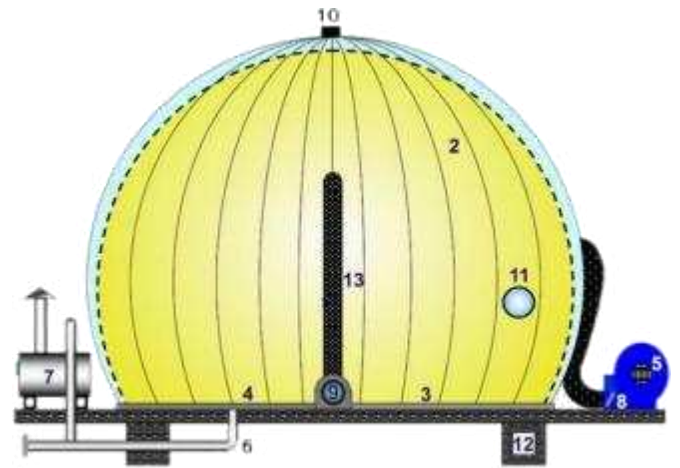


DOUBLE
MEMBRANE
GAS HOLDER
FREESTANDING

DOUBLE MEMBRANE GAS HOLDER FREESTANDING

The double membrane gas holder is a durable air-supported structure designed specifically for the storage of biogas. Typically, gas holders are installed as part of anaerobic digestion systems in wastewater treatment plants, agricultural digestion projects, landfill sites, and cogeneration plants that utilize biogas generated from organic materials as an energy source.

The double membrane gas holder is primarily composed of three components: the outer membrane, inner membrane, and base membrane. The outer membrane serves a protective role for the system. Even under extreme conditions such as storms, the outer membrane continuously withstands positive pressure to maintain hydrostatic equilibrium. The inner membrane is used for storing biogas and expands or contracts based on the gas volume. The base membrane separates the foundation from the inner and outer membranes. Both the inner and outer membranes are made from specialized high quality biogas membrane material, possessing qualities such as UV resistance, aging resistance, abrasion resistance, methane permeation resistance, and a certain level of self-cleaning capability.

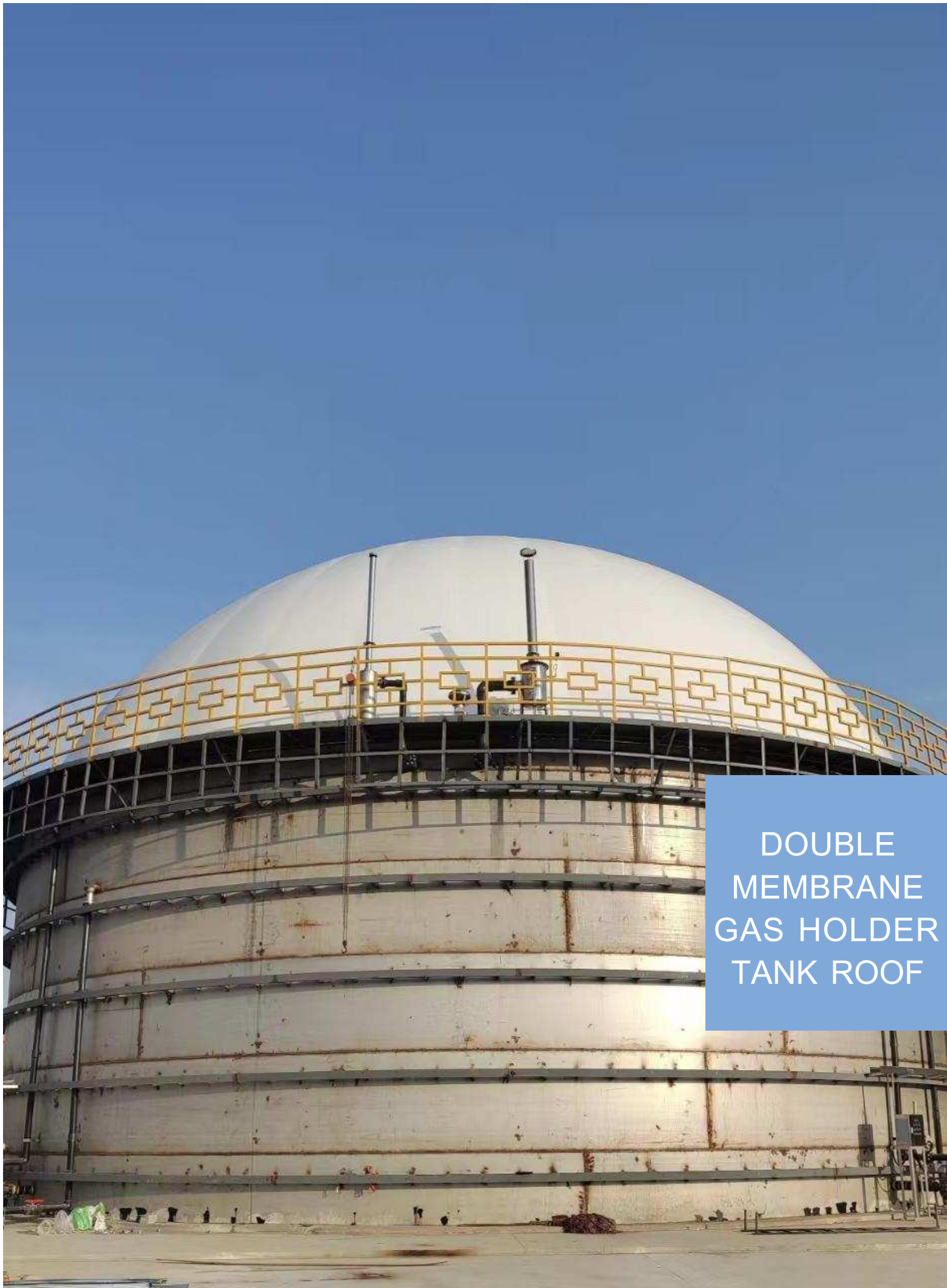


- | | |
|----------------------|---|
| 1. Outer membrane | 8. Check valve |
| 2. Inner membrane | 9. Outer Membrane Pressure Relief valve |
| 3. Base membrane | 10. Ultrasonic Level Transmitter |
| 4. Fixed ring | 11. Inspection window |
| 5. Air blower | 12. Base |
| 6. Biogas pipeline | 13. Air hose |
| 7. Safety water seal | |



ADVANTAGES:

- Low cost
- Security and stability
- High tensile strength
- Tear resistance
- Abrasion resistance
- Air tightness
- Self-cleaning function
- antioxidant
- Uv protection
- Corrosion resistance
- High utilization rate
- Save space
- Short construction period
- antifreezing



DOUBLE
MEMBRANE
GAS HOLDER
TANK ROOF

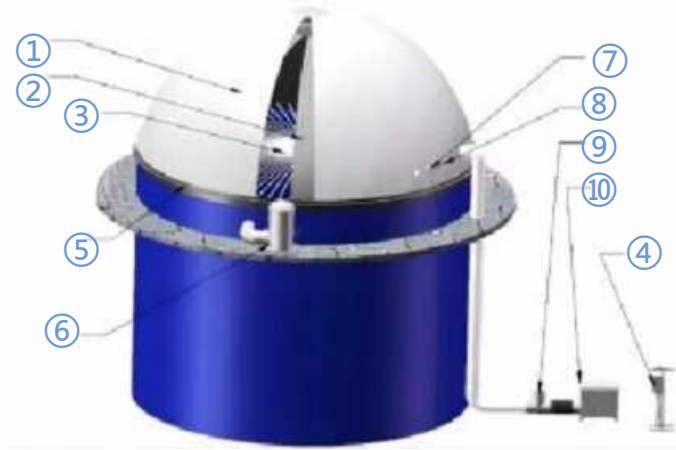
DOUBLE MEMBRANE GAS HOLDER TANK ROOF

The mounted double membrane gas holder combines fermentation gas storage into a single unit. The bottom portion consists of a digester tank body, while the upper portion is a 3/4 spherical gas storage structure made of special polyester material. This design greatly conserves ground space.

The outer membrane of the mounted double membrane gas holder is sealed and connected to the tank opening edge of the fermentation tank independently, while the inner membrane is used for storing generated biogas. They are both anchored to the embedded fasteners in the foundation and sealed. The inner membrane stores the produced biogas and releases it as needed under the control of the outer membrane's pressure.

The safety protection system is designed to safeguard the Haiyue double membrane gas holder by preventing excessive pressure in the inner or outer membrane due to system malfunctions, ensuring controlled discharge. The control cabinet system primarily detects gas holder pressure and inner membrane capacity, allowing for pressure relief protection and control of gas intake as per the design requirements.

The role of the outer membrane of the biogas holder is to create a pressure-regulating space, providing constant external pressure to the inner membrane to maintain a consistent biogas output. Simultaneously, the outer membrane offers protection to the inner membrane.




- | | |
|--|---|
| 1. Outer membrane | 8. Check window |
| 2. Inner membrane | 9. Outer membrane pressure relief valve |
| 3. Clamping profiles | 10. Air blower |
| 4. Control system | |
| 5. Backing plate and pressing plate | |
| 6. Positive and negative pressure water seal | |
| 7. Level transmitter | |

FEATURES:

- . High operating pressures
- . High volumes up to a hemispherical shape
- . Suitable for high snow and wind loads
- . Permanently gas-tight
- . Low investment and running costs
- . Short construction time
- . High reliability
- . Various fittings possible





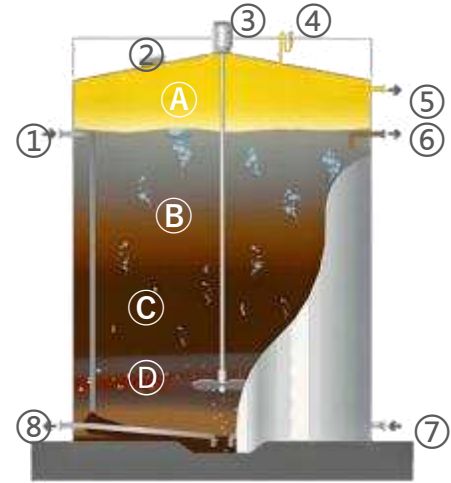
GLASS-
FUSED-TO-
STEEL(GFS)
TANK

GLASS-FUSED-TO-STEEL(GFS) TANK

Glass-Fused-to-Steel (GFS) tanks, also known as enamel assembly tanks, are composite processed products composed of two or more tank bodies made of enamel material, assembled in a rational manner. These tanks typically exhibit excellent corrosion resistance and heat resistance, making them suitable for various temperature and humidity environments.

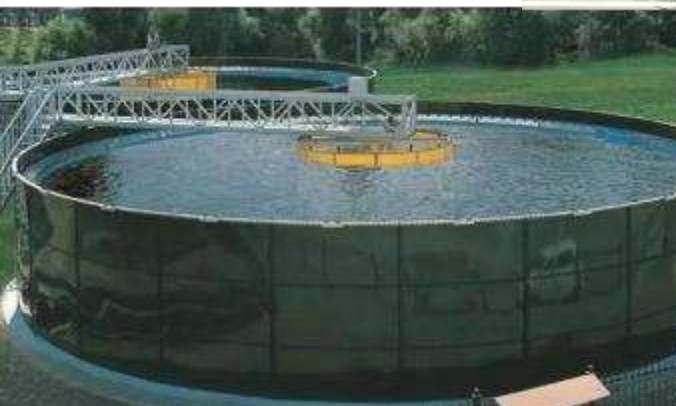
Assembled GFS tanks find widespread applications in various engineering fields such as anaerobic tanks, sewage treatment equipment in areas such as biogas, sewage treatment, chemical, and power industries. They are also used for steel storage tanks like grain silos, oil storage tanks, feed storage tanks, and wine material tanks. Additionally, they are utilized in the fabrication of drinking water and wastewater containers, filters, coolers, bio reactors, wastewater sedimentation tanks, intermediate process tanks, sedimentation tanks, and fermentation tanks.

The main structure of assembled GFS tanks includes assembly plates, reinforced angle steels for the tank top, tank wall, and tank bottom, as well as connecting blocks and specially designed installation bolts, along with weather-resistant silicone sealing compounds.



Take the CSTR tank for example

- | | |
|--------------------------|----------------|
| 1. Substrate inflow | A. biogas |
| 2. Access hole | B. Fluid zone |
| 3. Mixer | C. Sludge zone |
| 4. High-pressure valve | D. Mixing zone |
| 5. Effluent gas | |
| 6. Effluent substrate | |
| 7. Ground injection pipe | |
| 8. Ground sludge pipe | |



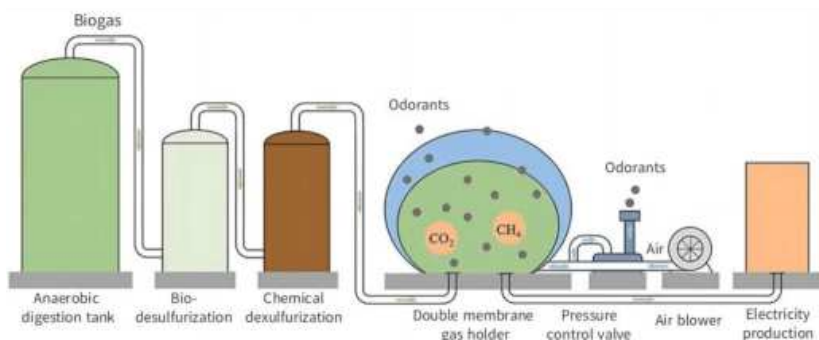
FEATURES:

- Superior anti-corrosion technology
- Wide range of applications
- Designed according to local conditions, according to the project construction location, the enamel assembled tank adopts wind resistance, earthquake resistance and other targeted design
- Rational use of the environment
- High degree of standardization
- Simple and quick installation, easy to realize the relocation and expansion of capacity



BIOGAS
DESULFURIZ
ATION

BIOGAS DESULFURIZATION



When utilizing biogas for energy purposes, the H₂S content in the biogas gas must not exceed 20mg/m³. H₂S must be removed as much as possible in both industrial and domestic gases.

Biogas from anaerobic digesters carries a large amount of H₂S, especially when fermented at medium or high temperatures. Since there is also a large amount of water vapor in the biogas, the water interacts with the H₂S in the biogas and accelerates the corrosion and clogging of metal pipes, valves and flow meters. In addition, the SO₂ generated by the combustion of H₂S combines with the water vapor in the combustion products to form sulfurous acid, which corrodes the metal surfaces of the equipment and also causes pollution of the atmosphere, affecting human health. Therefore, before using biogas, H₂S must be removed.

The commonly used methods for desulfurization of biogas in the industry are: dry desulfurization, wet desulfurization, biological desulfurization and several other desulfurization methods.



- Features of biological desulfurization
- High efficiency:
 - High adaptation range
 - Low cost
 - High safety
 - No need for guarding
 - Simple maintenance

Features of dry desulfurization

- Simple structure, easy to use
- No need to guard, regular change of material
- One for one, one for the other, running alternately
- Compared with wet type, regular material change is required
- Running cost is high

Features of wet desulfurization

- Continuous operation, strong desulfurization
- Low running cost
- Complicated process requires special person to be on duty
- Equipment needs to be maintained



BIOGAS FLARE

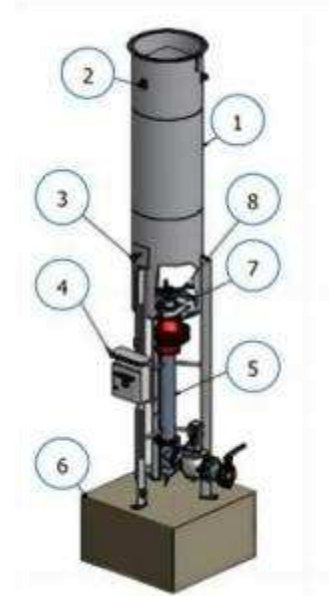


BIOGAS FLARE

During the production process of biogas engineering, a large amount of by-product gases with combustible components are often produced. Due to the different production processes of producing by-product combustible gases and the use of combustible gases by the users at the site, it is sometimes necessary to dissipate these combustible gases. If directly dispersed, combustible gases and the surrounding air diffusion and mixing of combustible gases generated clouds, meet the ignition source of deflagration. In addition, combustible gases generally contain carbon monoxide and hydrogen sulfide and other hazardous gases, in accordance with the environmental regulations do not allow the direct emission into the air, so all types of production processes to produce combustible gases by-products need to carry out harmless treatment and then dispersed.

For factories or premises with small gas production, the centrally collected biogas is usually incinerated by setting up a biogas flare. The biogas flare can improve the safety of the premises, reduce pollution, reduce the greenhouse effect and so on.

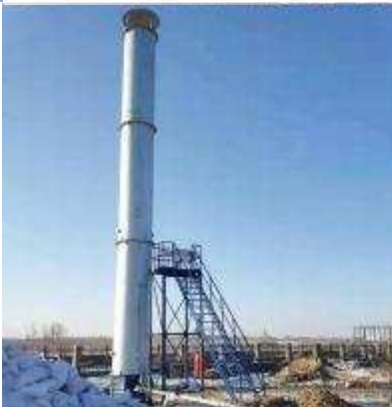
The scope of application can be selected according to the different conditions of breweries, food processing plants, pharmaceutical factories, sewage treatment plants, alcohol factories, farms, and the biogas flare incineration flow ranges from 50m³/h-3000m³/h.



1. FLAME PIPE/COMBUSTION
2. CHAMBERABLE STAY COLLAR
3. UV PROBE/FLAME MONITOR
4. IP54 SWITCH CABINET
5. GAS LINE
6. FOUNDATION
7. ELECTRODE IGNITION
8. BURNER HEAD

ROLE:

- Conveying and combusting waste gases generated in the treatment of the production
- The biogas flare burner handles flammable and explosive gases produced during commissioning, start-up and stopping of the plant.
- The biogas flare burner is used as a measure in case of emergency.



FEATURES:

- Explosion-proof design
- Multi-stage flame retardant safety design
- High load regulation ratio
- flare tower exterior temperature is lower than 60°C.
- The burnout rate is higher than 95%.
- Ignition success rate is higher than 98%
- Closed flare design load without open flame
- Easy transportation, installation
- The material is stainless steel or heat-resistant stainless steel, beautiful shape, long service life
- Easy transportation, installation



BIOGAS
BOILER

BIOGAS BOILERS

Biogas boiler is a boiler that burns biogas as fuel. It is a new type of energy boiler suitable for slaughterhouse and breeding plant, using (Anart) ultra-low nitrogen burner to fully burn biogas in the boiler, which is green and environmentally friendly in accordance with the national standard.


Biogas is mainly produced by fermentation reaction of animal feces, post-slaughtering dirt and leaves, etc. and collected. Biogas boiler is a new type of boiler with no running cost, which solves the problem of environmental pollution without producing pollutants, equipped with automatic control, easy to run and use.

Biogas boiler burner is divided into biogas water boiler burner, biogas hot water boiler burner, biogas steam boiler burner, biogas organic heat carrier boiler burner according to the medium; according to the use is divided into biogas heating boiler burner, biogas bath boiler burner, biogas boiling boiler burner and so on.



FEATURES:

- 1、Applicable to biogas, natural gas, liquefied gas multiple gas sources, combustion is full, no smoke and dust pollution.
- 2、High degree of boiler automation, temperature sensing switchboard, automatic water replenishment, high and low temperature protection, water shortage protection, etc.
- 3、High utilization rate of biogas: larger heating area, fuller heat absorption, high combustion efficiency.
- 4、Small footprint: compact structure of the whole machine, easy to install, beautiful appearance.

A large industrial biogas generator engine is shown in a factory setting. The engine is painted a dark green color and is mounted on a black metal frame. It features a complex network of pipes, including a prominent horizontal stainless steel pipe with a red protective sleeve. To the right, there is a large black cylindrical component with red pipes and a red-handled valve. The engine is surrounded by various mechanical parts, including a large spring-mounted component on top. The background shows a window with a view of the outdoors. A blue rectangular box with white text is overlaid on the bottom left of the image.

BIOGAS
GENERATORS

BIOGAS GENERATORS

Biogas generator is a kind of equipment that utilizes biogas produced from biomass waste (e.g., agricultural waste, animal and poultry manure, etc.) as fuel and converts it into electric energy through a generator. Its working principle is to utilize the combustion of biogas to produce high temperature and high pressure gas, which pushes the rotor of the generator to rotate, thus generating electric energy.

Biogas generators utilize the methane in biogas as fuel, and generate high temperature and high pressure gas through combustion to drive the generator to generate electricity. The working principle is as follows.

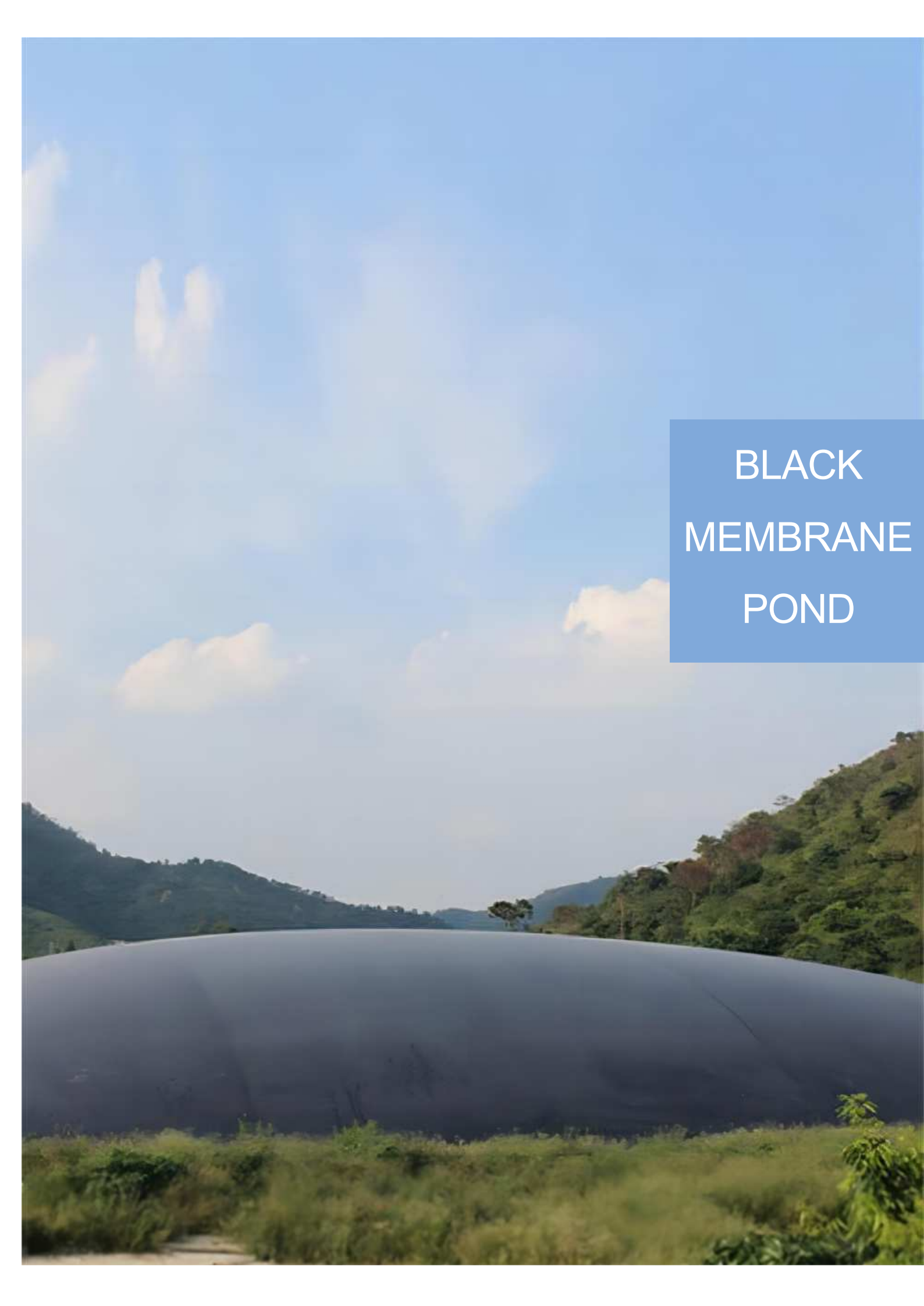
- Biogas collection: The biogas is collected from the digester, and the impurities, water and harmful substances such as hydrogen sulfide are removed, so that the biogas meets the fuel requirements of the generator.
- Combustion: The treated biogas is introduced into the generator, mixed with air and burned inside the generator to produce high temperature and high pressure gas.
- Driving power generation: The high temperature and high pressure gas pushes the rotor of the generator to rotate and generate electricity output.
- Emission of exhaust gas: The exhaust gas generated in the process of power generation is purified and discharged.

By utilizing biogas resources, biogas generators not only utilize organic waste, but also reduce greenhouse gas emissions.



FEATURES

- Compact structure, easy to install and maintain
- Simple and easy to use control system, low maintenance cost
- long service life
- high stability of work
- good high temperature resistance characteristics
- good seismic performance
- With combustible gas fuel cell system.
- strong environmental adaptability

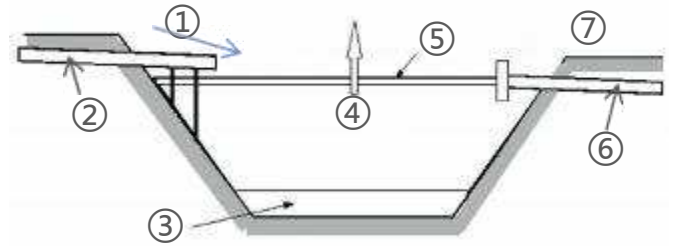
A large, dark, dome-shaped structure, likely a black membrane pond, is the central focus of the image. It is situated in a valley between green, forested hills. The sky is a clear, bright blue with scattered white clouds. The foreground shows some green vegetation and a dirt path.

BLACK
MEMBRANE
POND

BLACK MEMBRANE POND

Black membrane pond is deeper, generally in more than 2.5m, the deepest up to 45m, the organic load is higher, organic matter degradation requires more oxygen than photosynthesis and atmospheric reoxygenation can provide the amount of oxygen, so that the pond is anaerobic state. The organic load of the black film pond is generally up to 40~100gBOD5/(m³-d), and the pond covers a small area. The main biochemical reaction is acid fermentation and methane production, so the black membrane pond produces odor, poor environmental conditions, and the treated effluent cannot meet the discharge requirements. Black membrane pond is generally set in the sewage BOD₅>300mg/L, usually placed in the first end of the pond system, will be used as a pretreatment with the combination of parthenogenetic ponds and aerobic pond operation, its function is to use the anaerobic reaction of high efficiency and low consumption of the characteristics of the removal of organic matter, to ensure that the subsequent ponds to the effective operation of the pond!

Black membrane pond should be set up grille pretreatment facilities, such as sewage sand content or high oil content should be added sand sedimentation tank or degreasing tank. In addition, the effluent from the black film pond is still high in organic matter and needs to be further treated by partially oxygenated ponds and aerobic ponds.



1. Effluent in—organic mater and nutrients
2. Inlet pipe
3. Bottom sludge—solids some organic N and P
4. Gases—carbon dioxide methane ammonia
5. Crusting—solids
6. Overflow pipe
7. Effluent out—higher quality 70% less BOD



Black membrane pond is mostly used to deal with high concentration of organic wastewater, such as meat processing, food industry, livestock and poultry farms and other wastewater.

ADVANTAGES:

pollutants can be degraded 20% to 30%, thus reducing the volume of the subsequent partially aerobic and aerobic ponds; anaerobic can make part of the difficult to degrade organic matter into easily degradable organic matter, is conducive to the subsequent pond treatment; wastewater through the black membrane pond can be eliminated in subsequent ponds of the floating and reduce the thickness of the bottom sediment siltation layer.





RED MUD
MEMBRANE
BIOGAS
BAG

RED MUD MEMBRANE BIOGAS BAG

Red mud membrane biogas bag refers to the biogas bag which is made by using new technology and new material and can be folded, mainly red mud membrane biogas bag and biogas digester. The storage bags are generally divided into cylindrical and rectangular. The digester is mainly divided into teapot shape and floating cover shape.

The processing process of red mud biogas bag is processed by using composite membrane, membrane plus high-strength industrial polyester fiber using the production process of lamination, which is more suitable for some areas in the southwest where there is a big temperature difference between day and night.

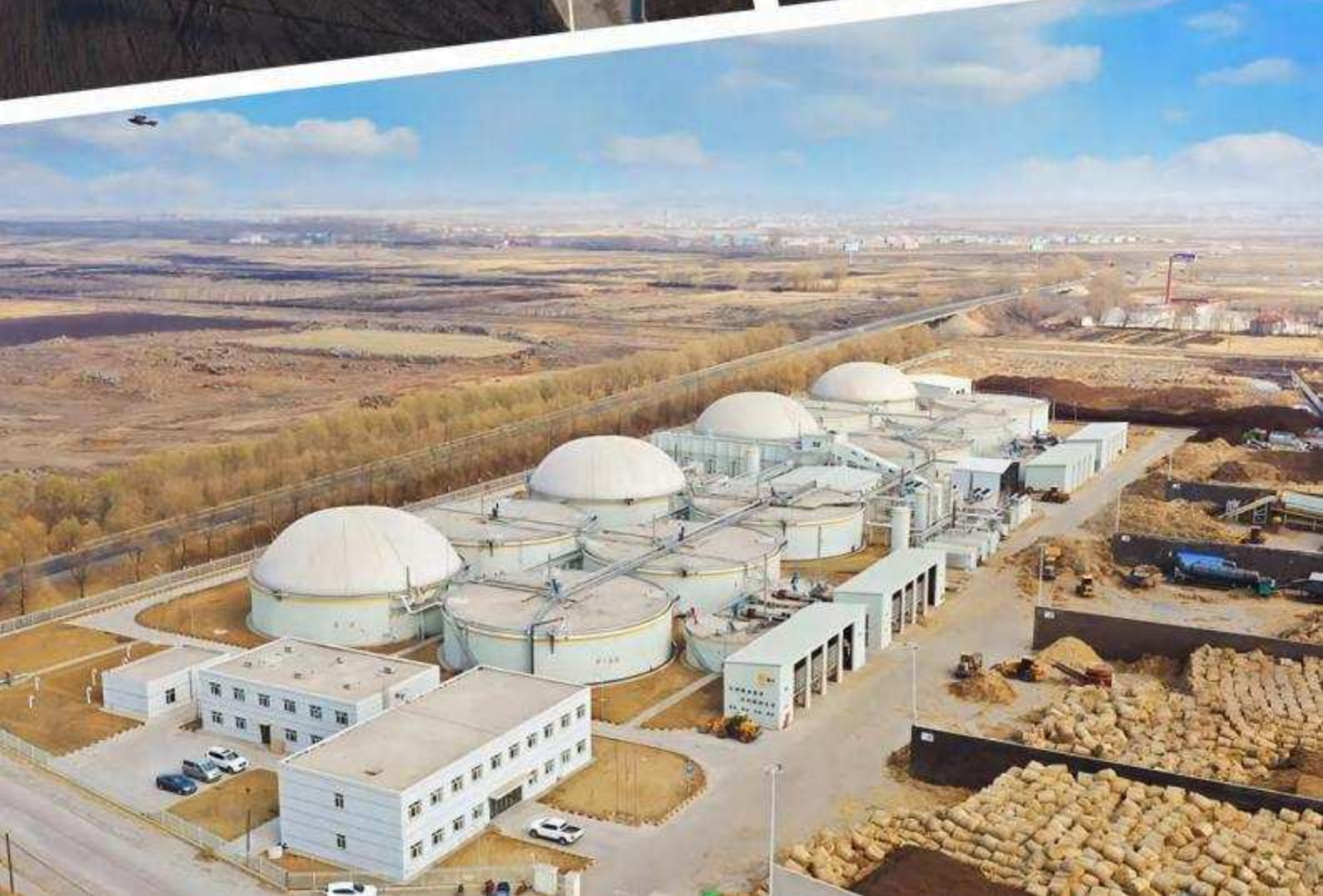
Floating cover type biogas digester generator pool, generally used for engineering use. The pool is made of bricks or cement casting, generally round or square pool, and above the pool is made of red mud film biogas bag into a semi-cylindrical cover above the pool, fixed in the semi-cylindrical cover after the middle part of the steel pipe or transparent buckle and PP webbing fixed. At this time, we should pay attention to the problem of airtightness, when covering the pool, it must be not into the biogas liquid, the deeper the better. The advantage is that this way to clear the pool is convenient, regularly lifting the bag, can be directly cleaned.



ADVANTAGES:

- Strong resistance to light and heat aging, better weather resistance, tensile strength, elongation, anti-penetration properties, anti-perforation properties.
- Flame retardant properties, thermal stability, waterproofing, corrosion resistance.
- The use of a longer period of time.





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