
ECOMEMBRANE®
GAS STORAGE SOLUTIONS


I padri fondatori
DEI GASOMETRI A MEMBRANA
DELL'ERA MODERNA

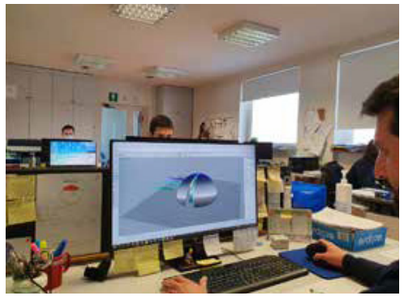
WE HAVE BEEN OPERATING IN THE RENEWABLE ENERGY SINCE 2000.

Ecomembrane is a **manufacturer of gasholders, digester covers, and odor control covers using performance guaranteed, PVC coated membranes assembled** using high frequency dielectric welding to ensure gas tightness.

Beyond our specially **formulated membranes and welding techniques**, we also **patent and produce metal goods and integral system components** in order to provide the best performing and longest-lasting gasholders on the market.

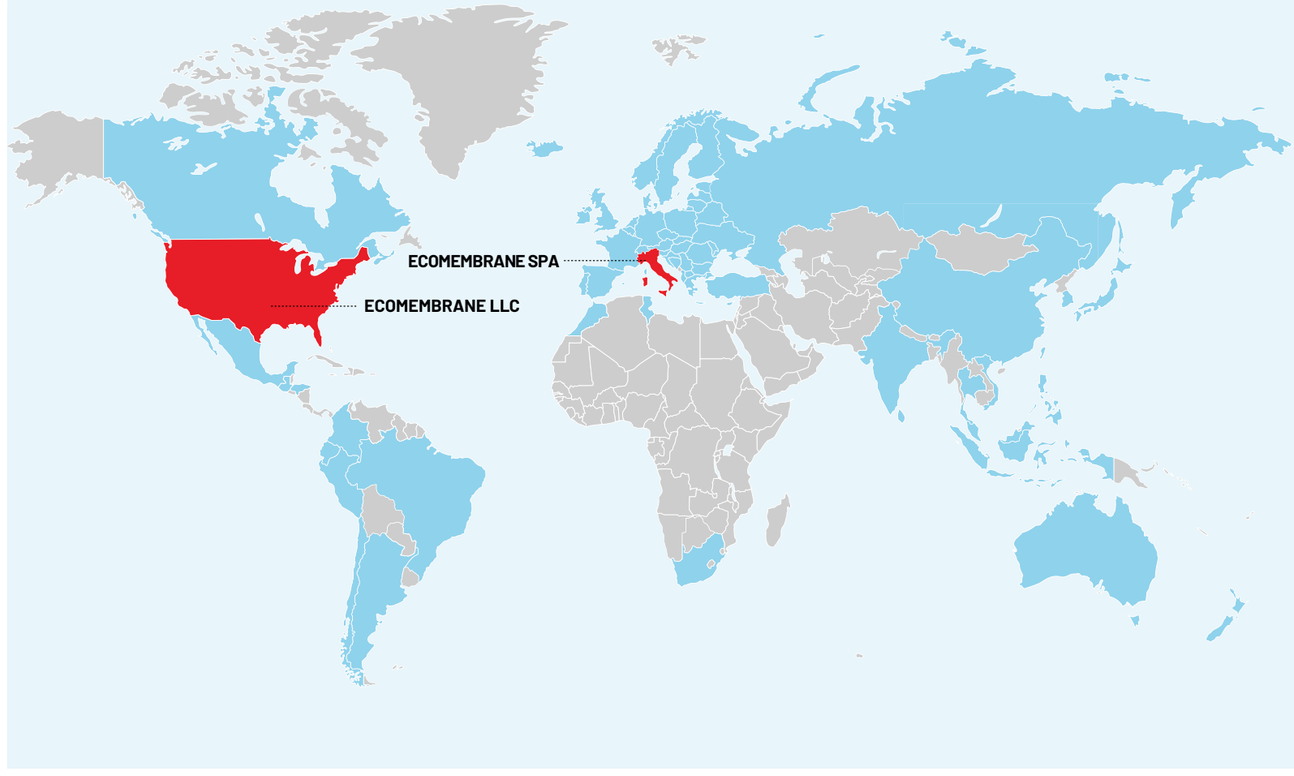
OUR WORK IN THE BIOGAS FIELD HAS LED TO THE ISSUANCE OF 10 PATENTS, INCLUDING UNIQUE MEMBRANES, LIKE OUR HEAT SHIELD TO OUR SPECIAL VOLUME LEVEL SENSOR

We work in the agricultural/industrial plants, STP/WWTP and landfills.



WE ARE MADE IN ITALY and MADE IN USA

With more than 1300 installations all over the world.



ECOMEMBRANE IS **COMPETENT AND RELIABLE.**

HIGH QUALITY
Every product component has been designed with the **best materials** available, to ensure **high performance** standards for **many years of use.**

ON DEMAND PRODUCTS
All ECOMEMBRANE's products can be manufactured and **customized to specific sizes**, storage capacities, shapes and colors specified by the client.

HIGH WORKING PRESSURE
In-house designed pressure control valves and use of **high quality** materials allow ECOMEMBRANE's gasholders to operate at working pressures beyond which **our competitors can reach.**

WORLD RECORD STORAGE
ECOMEMBRANE's knowledge and experience has enabled them to manufacture and install the **world's biggest membrane gasholders** which are ideal for clients who require large gas storage facilities.

ORIGINALITY
ECOMEMBRANE product designs and methods of manufacture are **protected by national and international patents.**

LOW MAINTENANCE
ECOMEMBRANE products are designed and installed with the goal of **minimizing maintenance costs** over the life span of the product.

OUR KEY VALUES ARE
PARTNERSHIP WITH OUR CLIENTS AND TRUSTWORTHINESS

We listen to yours and your project's specific needs.

We study the right solution for you by focusing on your project's unique requirements.

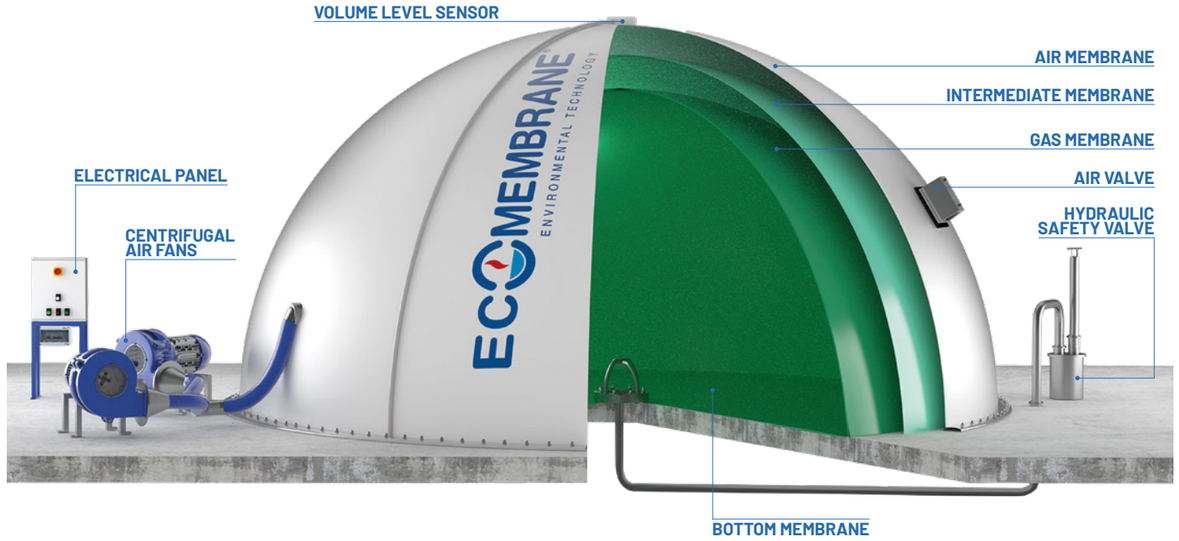
We will actively consult with you from the design stage through installation of our equipment.

We are with you during the installation – anywhere in the world.

When you choose Ecomembrane, you are making an investment in your plant.

PRODUCT INDEX

BIOGAS
BIOMETHANE



3 MASTER®

PATENTED • PATENTED • PATENTED •

3 MEMBRANE GASHOLDER

Three membrane constant-pressure gasholders are designed to store biogas made from the anaerobic digestion of organic waste and sludge.

They are manufactured with biogas resistant PVC coated polyester fiber fabric membranes seam welded by high frequency electronic machines.
The exclusive 3MASTER system is designed to form an upper air chamber that gives a pneumatic push on the biogas chamber, which keeps the biogas chamber at a prefixed and constant positive pressure.
The distinctiveness of the system is the addition of a special intermediate membrane to our dual membrane system. This additional special intermediate membrane is coupled with the inner gas membrane, completely separating the air and gas chambers, and eliminating the potential formation of an explosive air-gas mixture.

MAIN FEATURES

High safety level

Ecomembrane's patented three-membrane system eliminates the formation of an explosive mixture:
• The gas chamber is completely separated from the air chamber by a double layer of membranes.
• Our special "exhalation vents" ensure the evacuation of any micro-leaks which can naturally occur due to the permeability of membranes.

Low energy consumption

The compensation air blower only operates when the biogas is being used from the gasholder and switches off when the gasholder is filling. The air blower is controlled by a pressure sensor and an air valve is fitted to the air chamber and set to limit the maximum operating pressure ensuring constant pressure of the biogas throughout the filling and emptying cycle.

Long Life

3MASTER gasholders are UV resistant and designed to withstand substantial wind and snow loadings. The internal membrane is biogas tight.

BIO GAS / BIOMETHANE

2 MASTER®

2 MEMBRANE GASHOLDER

Two membrane constant-pressure gasholders are designed to store biogas made from anaerobic digestion of organic waste and sludge.

They are manufactured with biogas resistant PVC coated polyester fiber fabric membranes seam welded by high frequency electronic machines.

Our 2MASTER system is produced using a single inner and outer membranes. The outer membrane is pressured using our specifically designed air pressurization system consisting of pressure blowers (operating 24/7) and our uniquely design membrane-mounted air pressure regulation valves.

MAIN FEATURES

High storage and gas flow rate

The 2MASTER system is suitable for applications where high storage volume is expected.
The lighter weight of the 2 membrane allows larger gas holders to be constructed.
The 2 membrane system is also proposed where high and variable gas flow rates are expected.

Low cost

Two membrane construction and a simple air pressurization system used in the 2MASTER system allow for a low and competitive cost.

CUPOLA M3®

PATENTED • PATENTED • PATENTED • PATENTED •

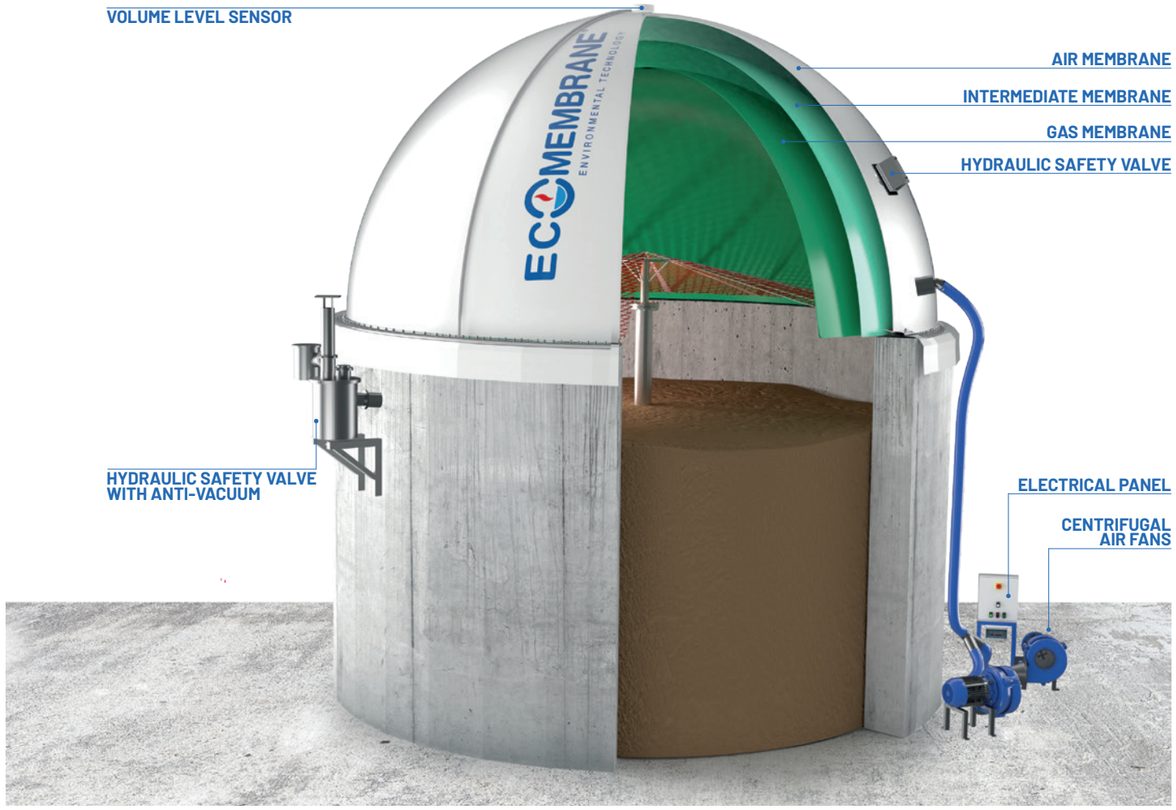
3 MEMBRANE GASHOLDER DOME

The constant-pressure CUPOLA M3 is designed to collect and accumulate biogas from directly over anaerobic digesters or sludge holding tanks.

They are made with biogas resistant PVC coated polyester fiber fabric membranes seam welded by high frequency electronic machines.
Ecomembrane's CUPOLA M3 system is similar in design with our 3MASTER gasholder eliminating the possibility of an explosive air-gas mixture.
The emergency discharge of biogas, resulting from over-pressure or excess gas production, occurs using our gas safety valves. Our volume level measurement system detects and signals the amount of gas present in the digester cover, to help the operator manage the withdrawal of biogas from downstream users.
The membranes are secured to the top of the tank wall, ensuring gas tightness, either (1) hydraulically, a special "weighted apron" immersed in the slurry, or (2) mechanically, using a system consisting of anchor flanges and edge seals.
CUPOLA M3 covers are stable and resistant to wind, rain and snow, and can be installed on concrete and steel tanks.

GASHOLDER DOME REPLACEMENT

CUPOLA M3 covers are particularly suitable for **replacing the old metal "gas bells"** often found in purification plants. This system can be installed in a **few days** and allow you to maintain or even increase storage capacity, with **low replacement costs** and significantly **reduced maintenance costs.**



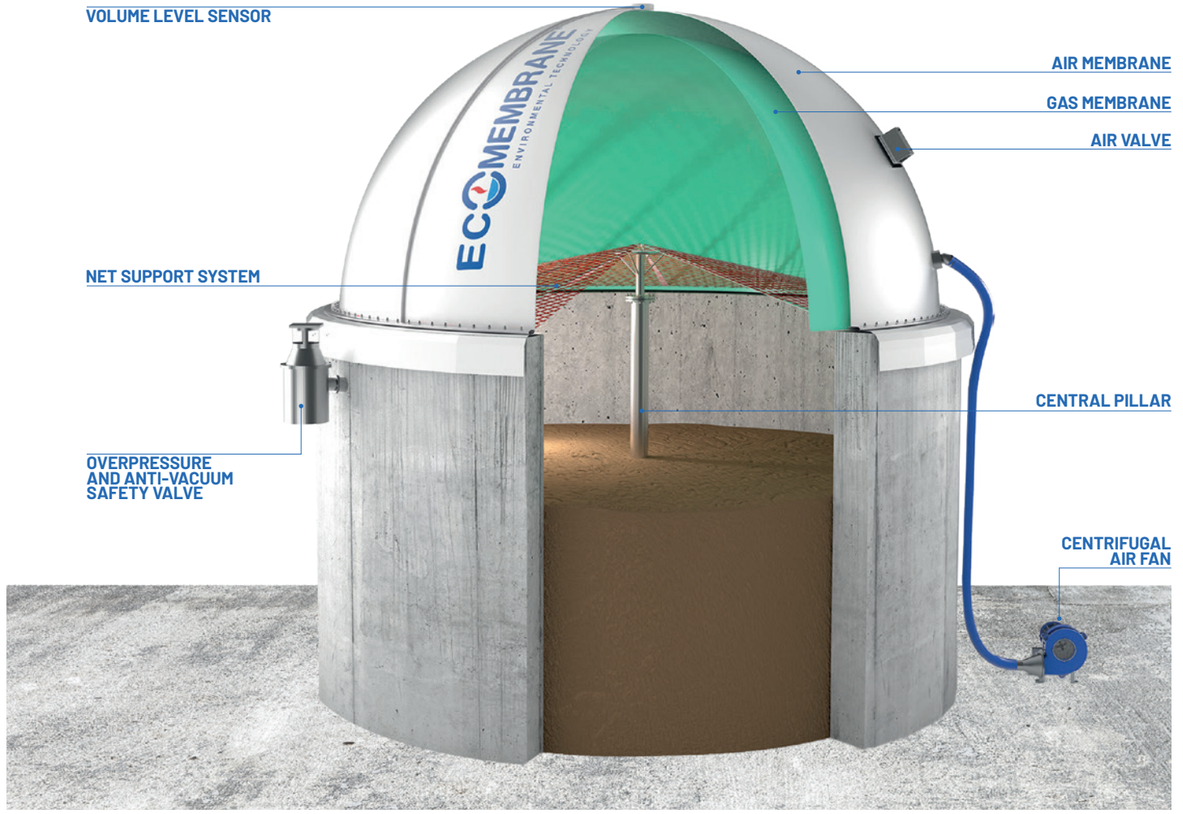
CUPOLA M2®

2 MEMBRANE GASHOLDER DOME

The CUPOLA M2 domes are used in industrial and agricultural plants.

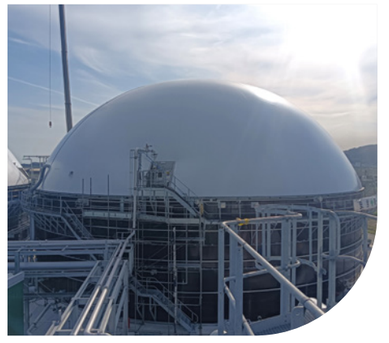
They can be installed quickly both on concrete and seel tanks. They can be manufactured with different quality materials and shapes based on the working pressure required.
In the livestock sector, a tested and long-lasting system is supplied. The CUPOLA M2 consists of 2 membranes, anchored to the top of the tank, operating at low pressures, and pressurized using our air pressurization system.
Higher pressure covers, primarily requested with industrial and municipal digesters, are made using special reinforced membranes and enhanced welding techniques.
A support structure made with bands and net, sustained by a central pole in steel or concrete, is positioned under the gas chamber.

The system has three main functions:
1. To keep the gas membrane from direct contact with the slurry
2. Prevent the possibility of mechanical corrosion on the mixers
3. Serve as a fundamental support structure for sulphur-fixing bacteria.







CUPOLA M2
HEAT SHIELD OPTION®

The primary objective of CUPOLA M2 HEAT SHIELD option is to reduce the heat loss from digester at its highest possible level.

The CUPOLA M2 HEAT SHIELD option is composed by three layers of membrane working as a roof on the top of the digester:
• The external double-sided PVC coated polyester fiber fabric membrane is inflated with air.
• The special insulated Heat Shield intermediate membrane, made by a triple layer ultra-shielded material to separate the inner biogas chamber from the air chamber.
The special layers of this membrane act as a protection against heat dissipation in the following way:
1) A layer of aluminum reflects 96% of the radiating infrared heat
2) A layer of bubble polyethylene sheet reduces the heat loss trough convection
3) A layer of pure polyethylene sheet gives an high gas tightness to the air chamber thus protecting the inner gas membrane from oxidation.
• The inner double sided PVC coated polyester fiber fabric membrane, with Eco-Safe layer.

The CUPOLA M2 HEAD SHIELD digester cover operates using a special valve that regulates the flow of air to pressurize the cover. By limiting the injection of air to only when the operating pressure is decreasing, the "cooling" effect on the gas chamber is reduced.
This result can only be reached only using a three-membrane digester cover, as there is no need for a constant air exchange because of the physical barrier created by the intermediate membrane between the two independent chambers (air and gas).

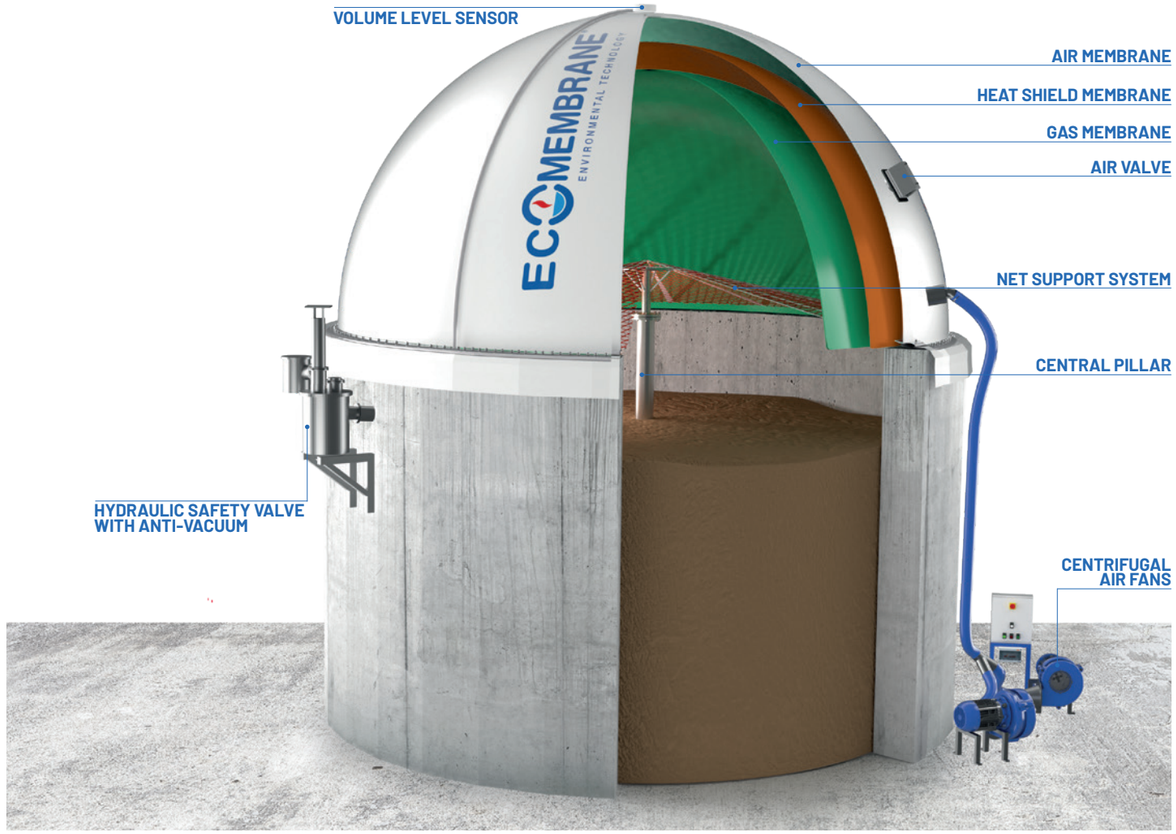
MAIN ADVANTAGES

Longer lifetime for the gas chamber membrane

Since the gas membrane is completely covered by the intermediate one (opaque), we do achieve a protection from any ultraviolet light source and from explosion to direct oxidation by the air pumped by the blowers.

Reducing of 50% heat transfer

Diminution of heat dissipation: consequently, energy costs for digester warming purposes are drastically reduced. Return on investment are considerably. speeded up because of major energy saving.



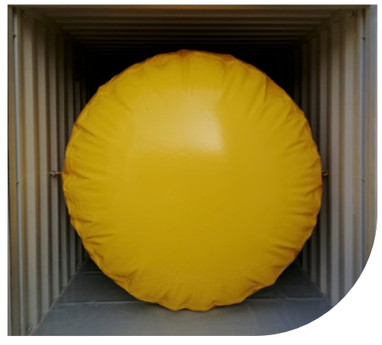
ECONTAINER®

ECOntainer is a containerized gasholder fully assembled and tested in our company, easy to transport and to install on site without any extra testing.

It is made of and internal membrane made with PVC coated polyester fabric that work as gas storage chamber, while the external pressure air chamber is formed by the sealed steel container that comes certified for sea shipping. The gasholder comes with inlet and outlet gas connection fittings and with specific accessories for the pressurization, the gas volume level sensor and the air and gas safety valves.

MAIN ADVANTAGES

- The gasholder can be placed on simple even surfaces **without need of concrete platform.**
- **It is gas tight** and can safely work in any wind or atmospheric extreme condition.
- It can support fast working filling cycles.
- **Very easy to move and to transport.**
- **Easy to serial production** with standard sizes.
- **It can be piled up** with more units connected with each other in series or in parallel without occupying any extra ground surface.



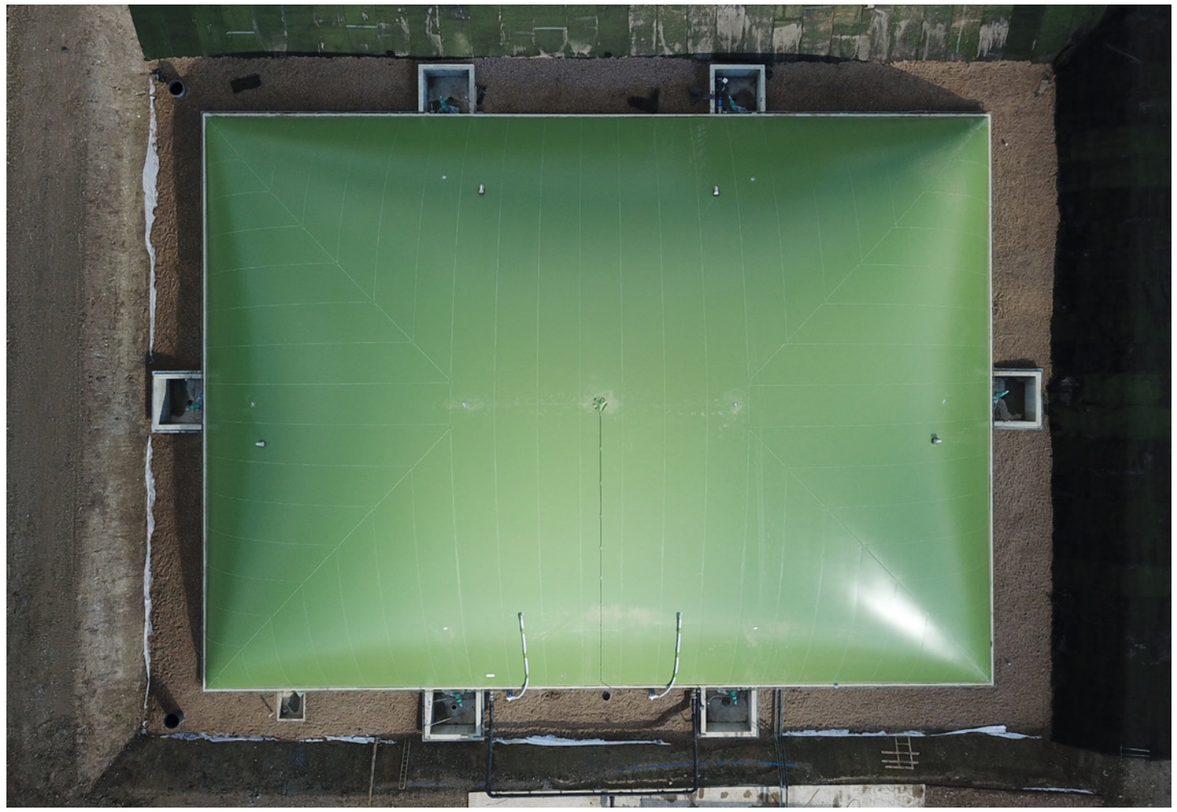
2MASTER®
ON PLATFORM

This dual membrane gasholder performs similarly to our 2MASTER system but is installed on a reinforced floor of a flat-rack container.

This system has a cylindrical shape, and is turn-key solution; tested and assembled in our factory, ready to be delivered.

MAIN FEATURES

- 200 m3 capacity, no more;
- Min 10 mbar up to 20 mbar;
- Platform Dimension: 12m X 2,4m;
- Platform weight: between 4.000Kg and 5.000Kg;
- **NO concrete basement;**
- **NO installation cost.**



DOUBLE MEMBRANE COVER FOR LAGOON

These gasholder covers can adapt to existing or planned areas with a rectangular/elliptical shape that have a concrete perimeter edge to allow the anchoring of the membranes.

Depending on the size, a support system equipped with one or more poles, bands, and net is recommended.
These solutions allow high storage volume capacities, even in narrow and long installation spaces.
If necessary, triple membrane covers can also be supplied.

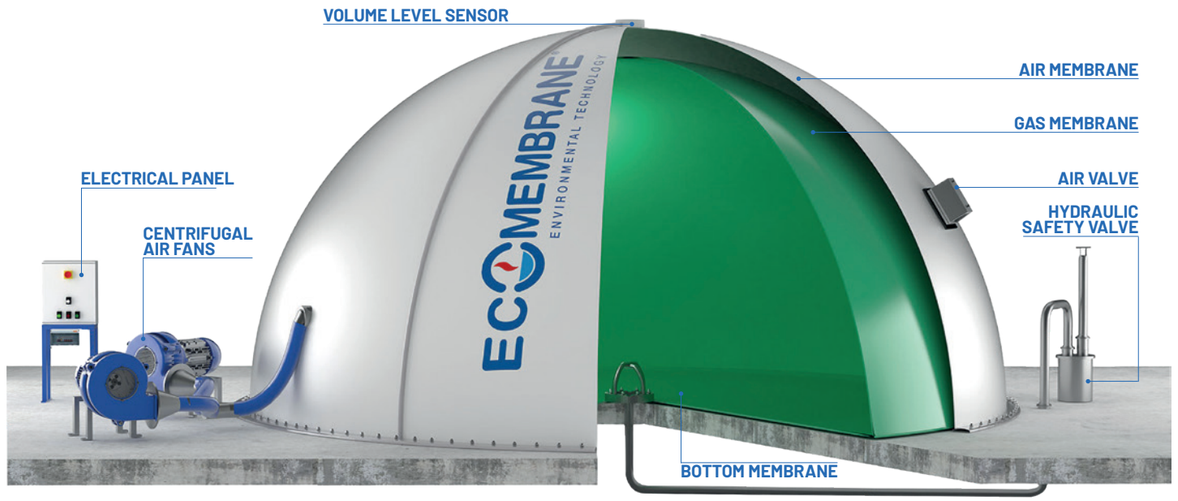
CO_2 HYDROGEN

CO_2 MASTER®

The CO_2 MASTER double membrane gasholder is the perfect storage solution able to safely store CO_2 at low pressure (5-30 mbar).

MAIN FEATURES

- **Fast installation**, similar to standard gasholders for biogas.
- **Excellent safety from leaks;**
- **Total control of volume** and easy management of signals to the customer PLC;
- **Easy maintenance;**
- Gas flow rate to suit customer requirements;
- **1/2 sphere design.**



CASE STUDY

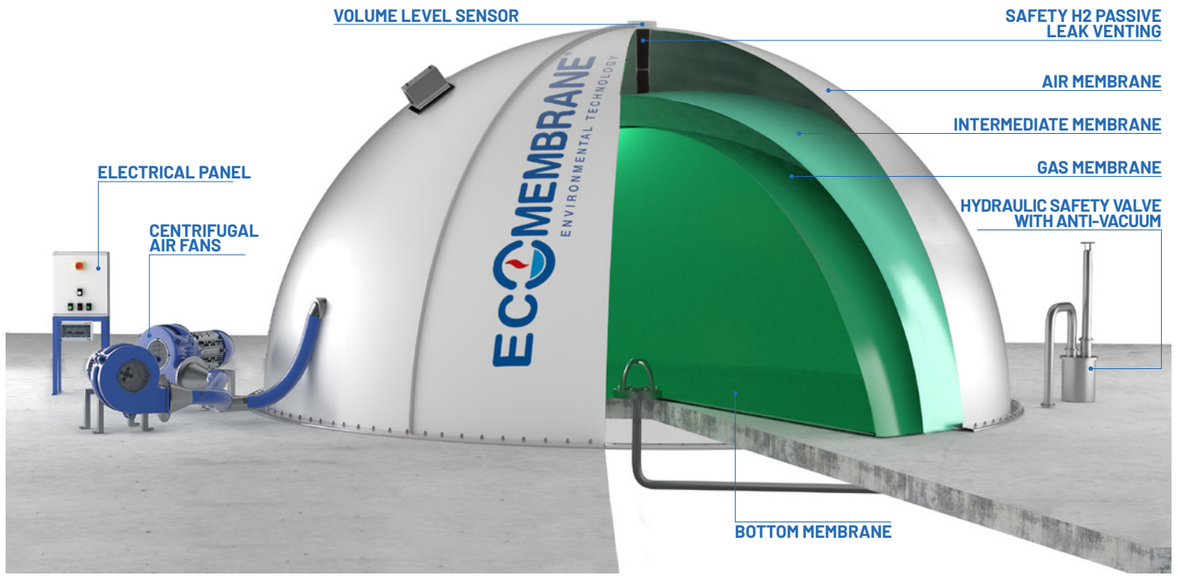
Type:

CO2 MASTER - DOUBLE MEMBRANE GASHOLDER

Ottana industrial plant (NU), Sardinia

Storage volume	32.000m3
External volume	35.000m3
Working pressure	4 mbar

Dimension
Lenght 76m - Width 36m - Height 18m



H_2 MASTER®

PATENTED • PATENTED • PATENTED •

The H_2 MASTER gasholder is the only 3 membrane gasholder able to safely store hydrogen gas.

Thanks to its particular design (patented) H2 MASTER is suitable to store hydrogen gas at low pressure (5-40 mbar) produced in the hydrolysis plants powered by renewable energies.

MAIN FEATURES

- **Fast installation**, similar to standard gasholders for biogas.
- **Excellent safety from leaks;**
- **Total control of volume** and easy management of signals to the customer PLC;
- **Easy maintenance;**
- Gas flow rate to suit customer requirements;
- **1/2 sphere design.**

HYDROGEN PLANT

ODOR CONTROL COVERS

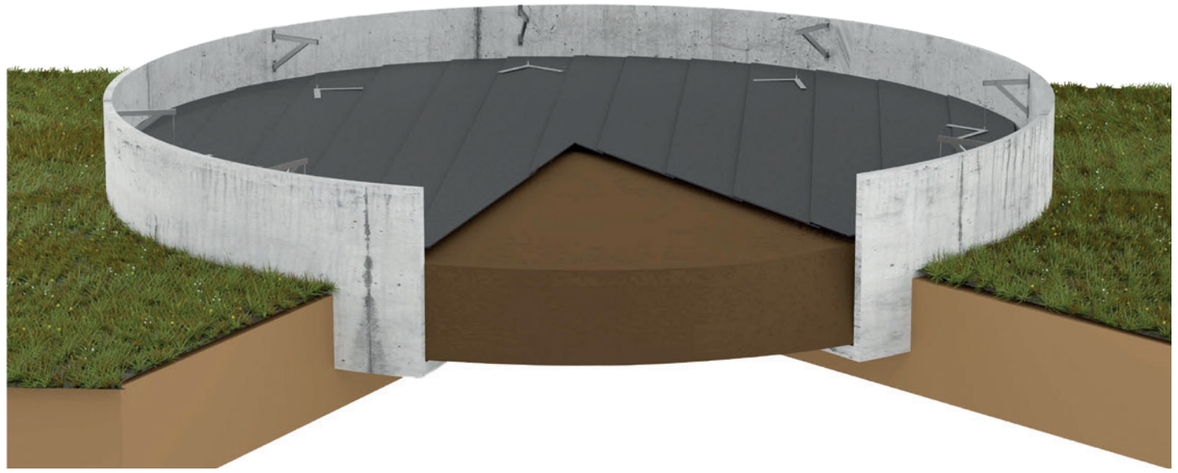
M1 COVER®

ODOR CONTROL COVER

The M1 COVERS are suited to cover pre-tanks and post digestion tanks.
They can be designed to cover the tank for odor containment and rainfall protection, or even to be gas tight and provide gas storage.
The conic shaped cover is supported by a central mast that ensures the required wind and snow resistance.

MAIN FEATURES

- Designed for tanks with diameters ranging from 10 to 40 meters;
- Adaptable to rectangular and elliptical tanks;
- Support structure made with bands and the possibility of one or more membrane access points;
- They are supported by a central steel or concrete pole, creating the shape of a pitched roof to provide the resistance of the structure to wind and snow load.



FLC COVER®

ODOR CONTROL COVER

FLC COVERS are custom designed to minimize odors and gaseous pollutants, and avoid evaporation and diffusion into the atmosphere caused by wind action.

The covers are made with flexible sheets of closed cell poly-ethylene foam that is resistant to acids and weathering.

FLC COVERS are installed on existing and new construction tanks of any size and shape.
Their main advantage is that they mostly eliminate odors from manure storage tanks, and industrial storage plants.

The FLC COVERS covers are installed in a special way to stay constantly
stretched on the surface of the slurry, even in the case of variable liquid level in the tank.
The covers capture most of the gas fumes odors by eliminating evaporation and diffusion into the atmosphere.
University research indicates that FLC COVERS cut up to 98% of the ammonia gaseous emissions from slurry.
They can also be equipped with a drainage system to prevent accumulation of rainwater in the tank.

MODULAR ANCHORAGE SYSTEM®

FOR MEMBRANE GASHOLDERS

The modular Anchorage System® is the quickest and easiest way for installing one membraned gasholder whenever one concrete basement is hard to build up.

All it takes is an escavation, following Ecomembrane instructions, for placing Ecomembrane special pieces.
The system is dismountable in case of need. No demolition is required.

MAIN COMPONENTS:

- Special **shaped steel panels**, painted with protective paint;
- **Special stiffeners and modular connectors;**
- **Anchor perimeter** clamping profiles for membranes.

MAIN FEATURES:

- **NO NEED** for concrete basement;
- Extremely **quicker realization** time if compared to standard anchor basements;
- Applicable **for double or triple membrane gasholders** up to 1.000 m3 capacity.

ACCESSORIES

HYDRAULIC SAFETY VALVE WITH ANTI-VACUUM

HYDRAULIC SAFETY VALVE

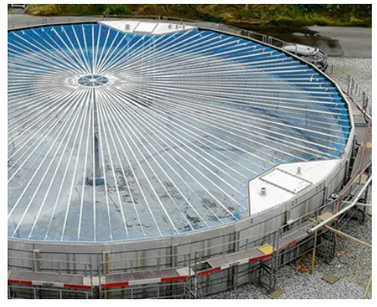
OVERPRESSURE AND ANTI-VACUUM SAFETY VALVE

NET SUPPORT SYTEM AND CENTRAL PILLAR

CENTRIFUGAL AIR FAN

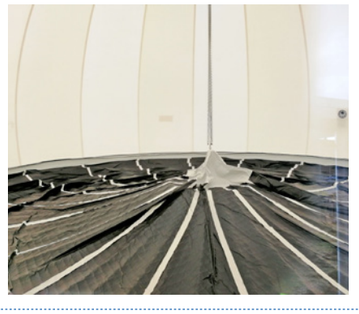
CENTRIFUGAL AIR FANS WITH ELECTRICAL PANEL

BALCONY

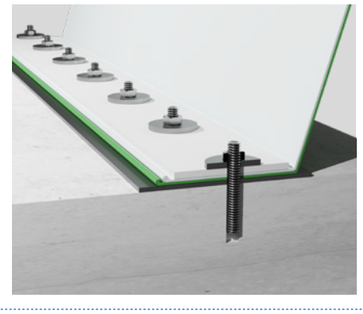


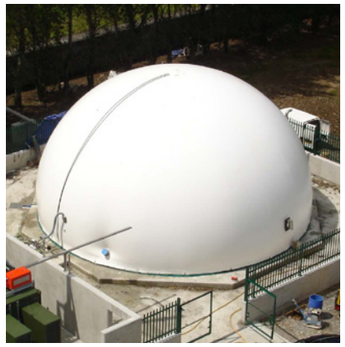
AIR VALVE

LEVEL SENSOR 4-20 mA



ANCHORAGE SYSTEM





GASHOLDERS

	1/2 SPHERE		3/4 SPHERE	
V (m³)	Ø max (m)	H (m)	Ø max (m)	H (m)
10	3,40	2,20	3,20	2,70
30	4,90	2,95	4,50	3,60
50	5,80	3,40	5,20	4,20
80	6,80	3,90	6,00	4,80
100	7,30	4,15	6,50	5,10
150	8,40	4,70	7,40	5,80
200	9,20	5,10	8,10	6,30
250	9,90	5,45	8,70	6,80
300	10,50	5,75	9,20	7,10
400	11,60	6,30	10,10	7,80
450	12,00	6,50	10,50	8,10
500	12,50	6,75	10,80	8,40
570	13,00	7,00	11,30	8,70
600	13,20	7,10	11,50	8,90
700	13,90	7,45	12,00	9,30
800	14,60	7,80	12,60	9,70
900	15,10	8,05	13,10	10,10
1.000	15,70	8,35	13,50	10,40
1.200	16,70	8,85	14,30	11,00
1.500	17,90	9,45	15,40	11,80
1.800	19,10	10,05	16,40	12,50
2.000	19,70	10,35	16,90	13,00
2.200	20,40	10,70	17,50	13,40
2.500	21,30	11,15	18,20	13,90
3.000	22,60	11,80	19,30	14,80
3.500	23,80	12,40	20,30	15,50
4.000	24,90	12,95	21,20	16,20
4.500	25,90	13,45	22,10	16,80
5.000	26,80	13,90	22,80	17,40
6.000	28,50	14,75	24,20	18,40
8.000	31,30	16,15	26,60	20,20
10.000	33,70	17,35	28,70	21,80
12.000	35,80	18,40	30,50	23,10
14.000	37,70	19,35	32,00	24,30
16.700	40,00	20,50	34,00	25,70

GASHOLDER DOMES

	1/4 SPHERE		1/2 SPHERE	
¯ tank (m)	H (m)	V (m³)	H (m)	V (m³)
6,00	1,60	18	3,20	54
7,00	1,85	30	3,70	86
8,00	2,10	46	4,20	129
9,00	2,35	67	4,70	184
10,00	2,60	94	5,20	254
11,00	2,85	127	5,70	339
12,00	3,10	166	6,20	441
13,00	3,35	213	6,70	562
14,00	3,60	268	7,20	703
15,00	3,85	332	7,70	866
16,00	4,10	404	8,20	1.052
17,00	4,35	487	8,70	1.263
18,00	4,60	581	9,20	1.501
19,00	4,85	686	9,70	1.767
20,00	5,10	802	10,20	2.062
21,00	5,35	931	10,70	2.389
22,00	5,60	1.074	11,20	2.748
23,00	5,85	1.230	11,70	3.142
24,00	6,10	1.401	12,20	3.572
25,00	6,35	1.586	12,70	4.040
26,00	6,60	1.787	13,20	4.546
27,00	6,85	2.005	13,70	5.093
28,00	7,10	2.240	14,20	5.683
29,00	7,35	2.492	14,70	6.316
30,00	7,60	2.723	15,20	6.995
31,00	7,85	3.052	15,70	7.720
32,00	8,10	3.361	16,20	8.494
33,00	8,35	3.690	16,70	10.194
34,00	8,60	4.040	17,20	11.123
35,00	8,85	4.412	17,70	12.107
36,00	9,10	4.805	18,20	13.147
37,00	9,35	5.222	18,70	14.245
38,00	9,60	5.661	19,20	14.245
39,00	9,85	6.125	17,90	15.403
40,00	10,10	6.613	20,20	16.621

Ecomembrane Spa
Via Pari Opportunità, 9 - 26030 Gadesco Pieve Delmona
Cremona - ITALIA / Tel. (+39) 0372 463599
www.ecomembrane.com - info@ecomembrane.com

Ecomembrane LLC
3912 E. Progress Street - North Little Rock
ARKANSAS 72114 - USA / Tel. (+1) 501 801 0397
www.ecomembrane.com - sshroyer@ecomembrane.com