



EC  **MEMBRANE**®
ENVIRONMENTAL TECHNOLOGY



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ENVIRONMENTAL TECHNOLOGY

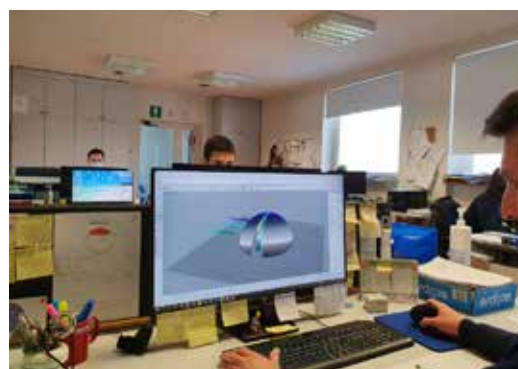
THE GASHOLDERS OF THE MODERN ERA

WE HAVE BEEN OPERATING IN THE RENEWABLE ENERGY AND BIOGAS FIELDS SINCE 2000

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

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.



APPLICATION FIELDS

25%

**AGRICULTURAL
PLANTS**

20%

**LIVESTOCK/
INDUSTRIAL
PLANTS**

30%

**INDUSTRIAL
PLANTS**

20%

**WASTE WATER
TREATMENT
PLANTS**

5%

LANDFILLS

**WE HAVE OVER
1000 PLANTS
INSTALLED
ALL OVER THE
WORLD**



THE ONLY COMPANY ON TWO CONTINENTS



ECOMEMBRANE LLC

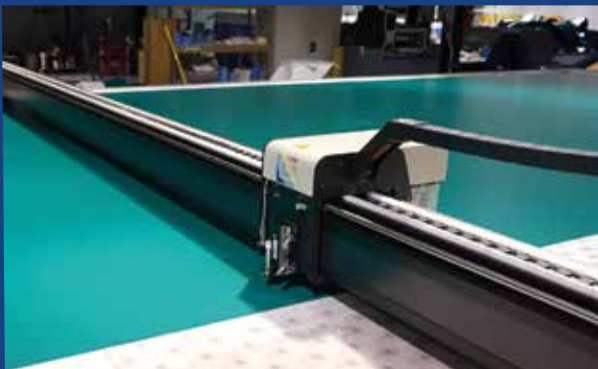
OFFICES



PRODUCTION



PRODUCTION



ECOMEMBRANE SRL

OFFICES



PRODUCTION



PRODUCTION



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



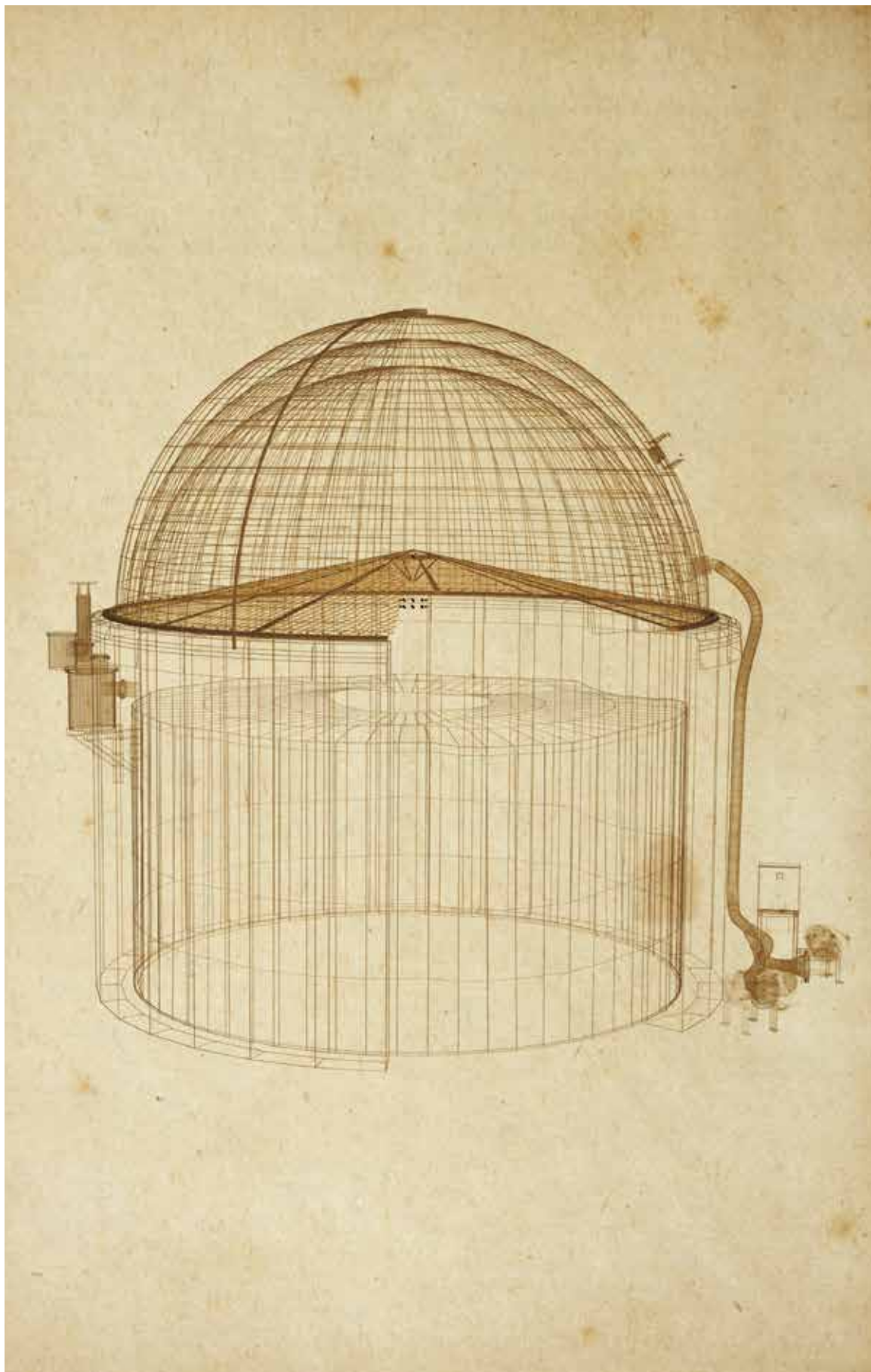
We will actively
consult with you from
the design stage
through installation of
our equipment



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



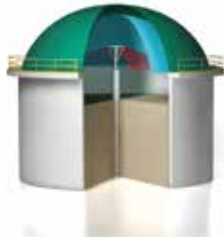
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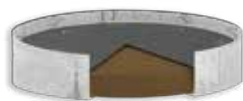
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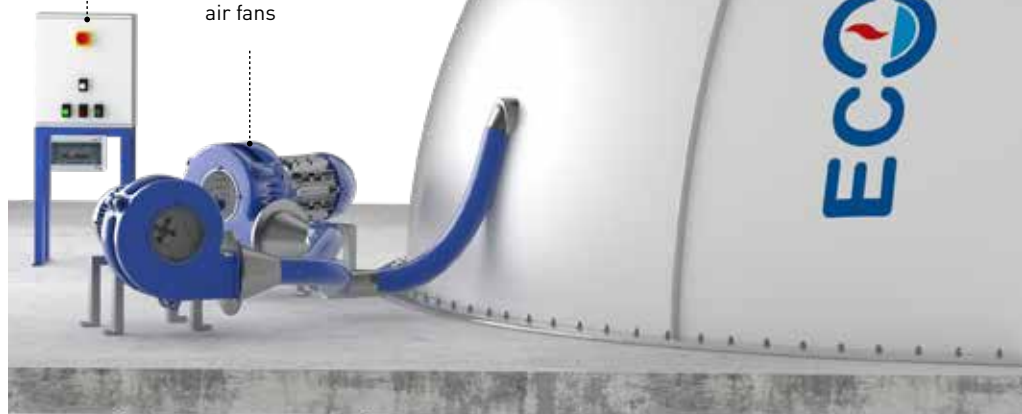


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ACCESSORIES



electrical panel

centrifugal
air fans



PATENTED

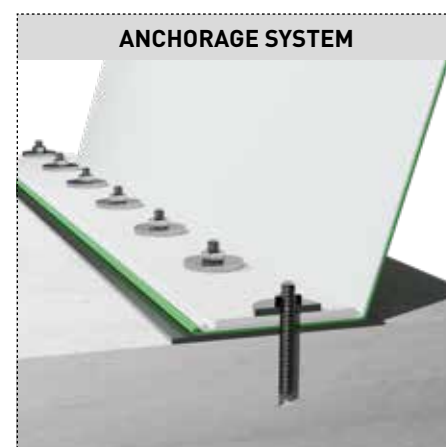
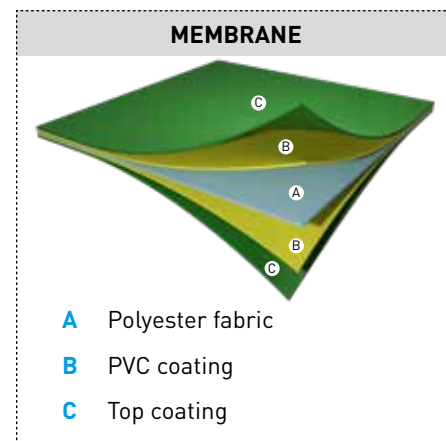
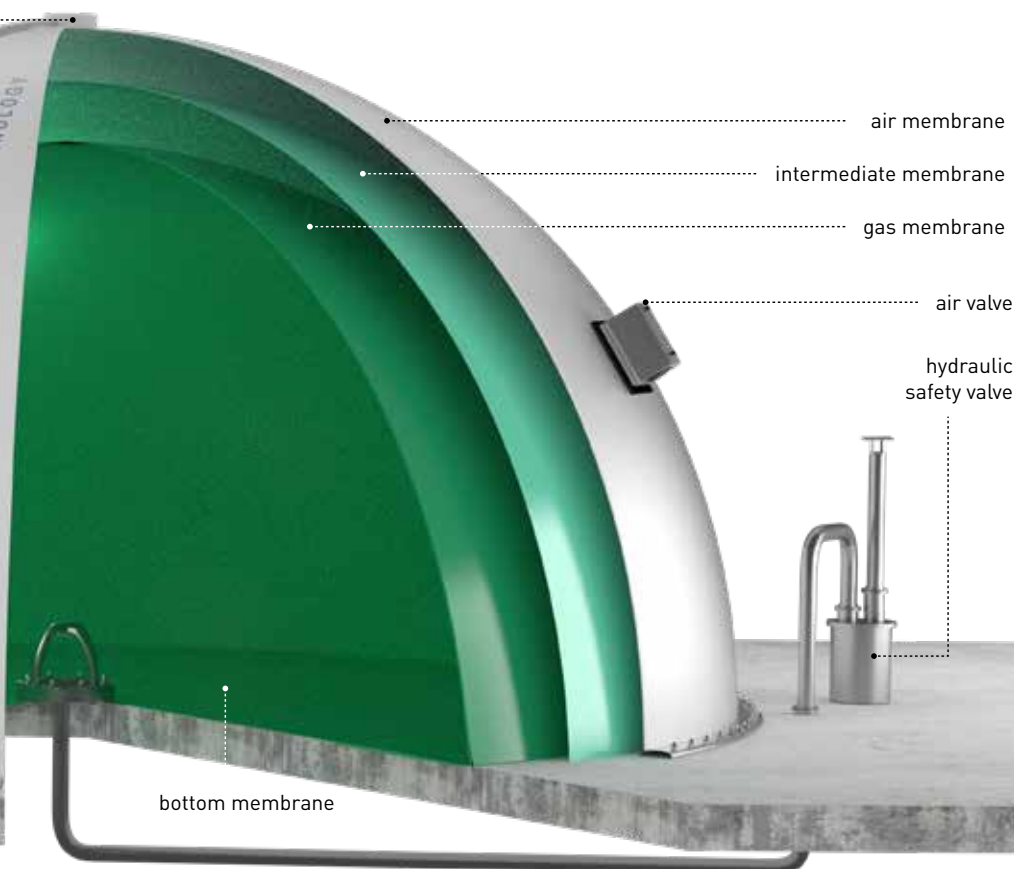
3MASTER®

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 polyester reinforced PVC 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 two chambers are divided from each other by a double membrane layer that ensures complete safety against the formation of a dangerous air and gas mixture. The one-piece gas chamber can be made in the factory, or on site. Closed piece construction prevents gas losses through the anchor bolts that fix the cover to the ground.



MAIN FEATURES



High safety level

ECOMEMBRANE'S patented 3 membrane system **negates any possibility of a gas and air explosive** mix because the biogas chamber is completely divided from the air compensation chamber.



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.

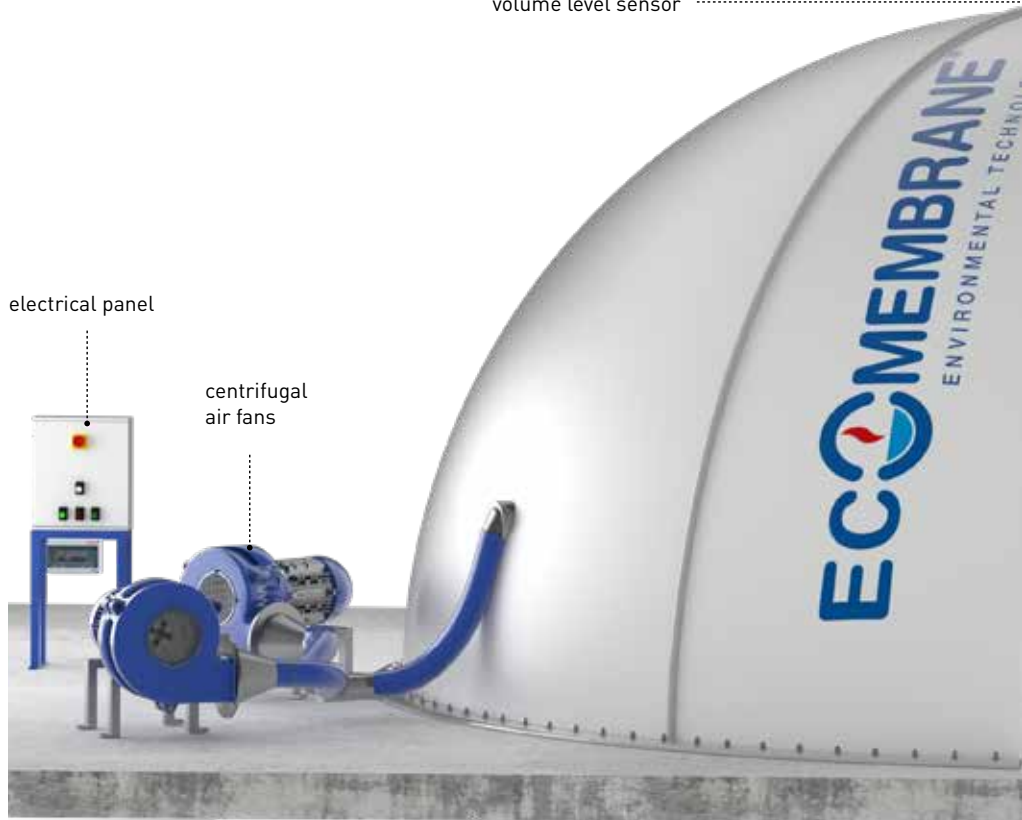




volume level sensor

electrical panel

centrifugal
air fans



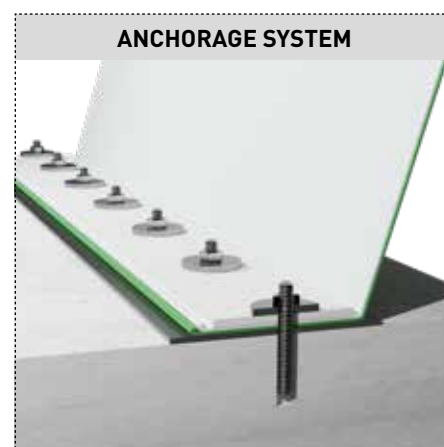
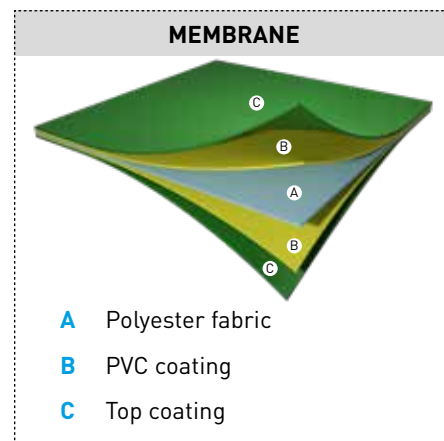
2MASTER®

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 polyester reinforced PVC membranes seam welded by high frequency electronic machines.

The 2MASTER system is made with a single upper membrane, pressurized by an air fan 24 hours a day to give a pneumatic push on the inner biogas chamber, keeping the biogas chamber at a prefixed and constant positive pressure. The one-piece gas chamber can be made in the factory or on site. Closed piece construction prevents gas losses through the anchor bolts that fix the cover to the ground or tank.



MAIN FEATURES



High storage and gas flow rate

The 2MASTER system is suggested for use in all cases where **storage volume is greater than 3000 m³**. 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.



Shape variability

It is possible to manufacture **gasholders with either a 1/2 sphere or 3/4 sphere shape**. Big sizes and sites where high winds are expected then a 1/2 sphere gas holder would be recommended. Upon request we can design special shape gasholders with rectangular base.



Low cost

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





volume level sensor

hydraulic safety
valve with anti-vacuum

PATENTED

CUPOLA M3®

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.

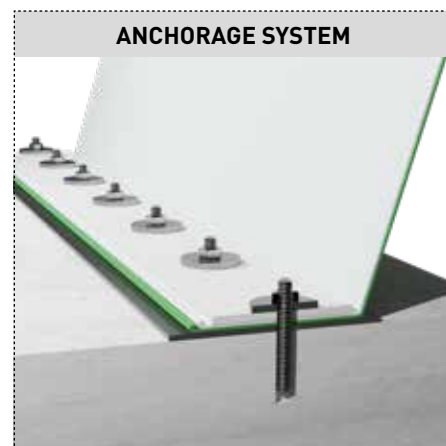
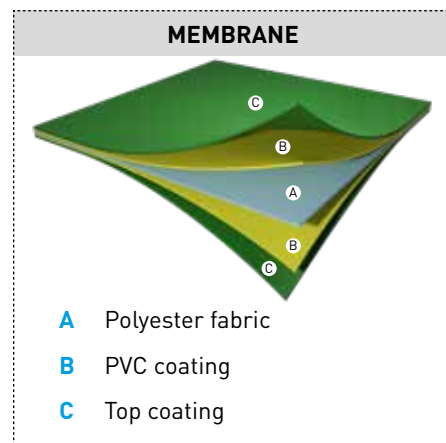
They are made with biogas resistant polyester reinforced PVC membranes seam welded by high frequency electronic machines.

The air discharge is made with specially designed mechanic valves, while the biogas safety system (necessary in case of over-pressurization) works with liquid fuse safety valves.

An electronic sensor senses the level during the filling of the gasholder, and transmits the information to the biogas users.

The mechanical anchoring system is made directly on top of the tank wall and gas tightness can be made hydraulically with a weighed submerged membrane or mechanically with special flanges and gaskets.

The CUPOLA M3 system is resistant to strong winds, rain, and snow load.



GASHOLDER DOME REPLACEMENT

The CUPOLA M3 domes are used to replace old steel gas holder domes, existing in present waste water treatment plants. Storage volumes can be maintained or increased and installation takes approximately one week to complete, while reducing replacement and maintenance costs.





volume level sensor

net support system

overpressure and
anti-vacuum safety valve



CUPOLA M2®

2 MEMBRANE GASHOLDER DOME

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

They install quickly and can be manufactured with different quality of materials and shapes to suit the needs of the customers.

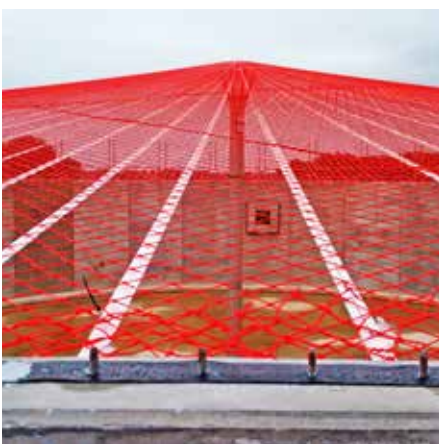
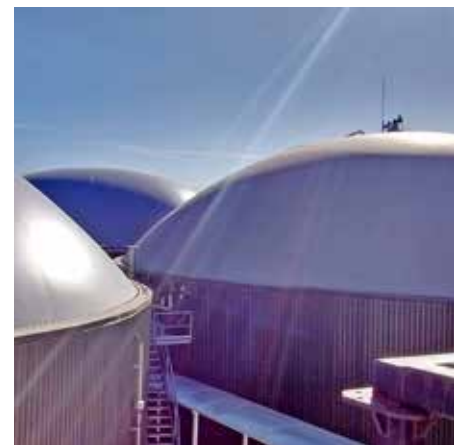
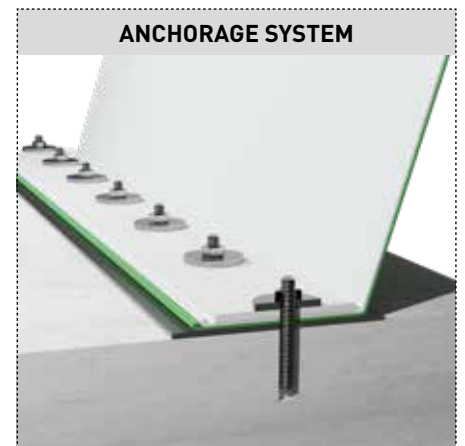
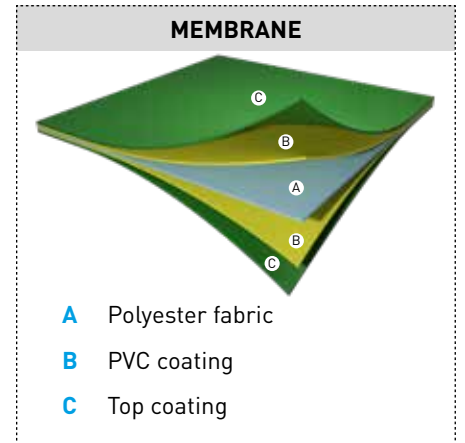
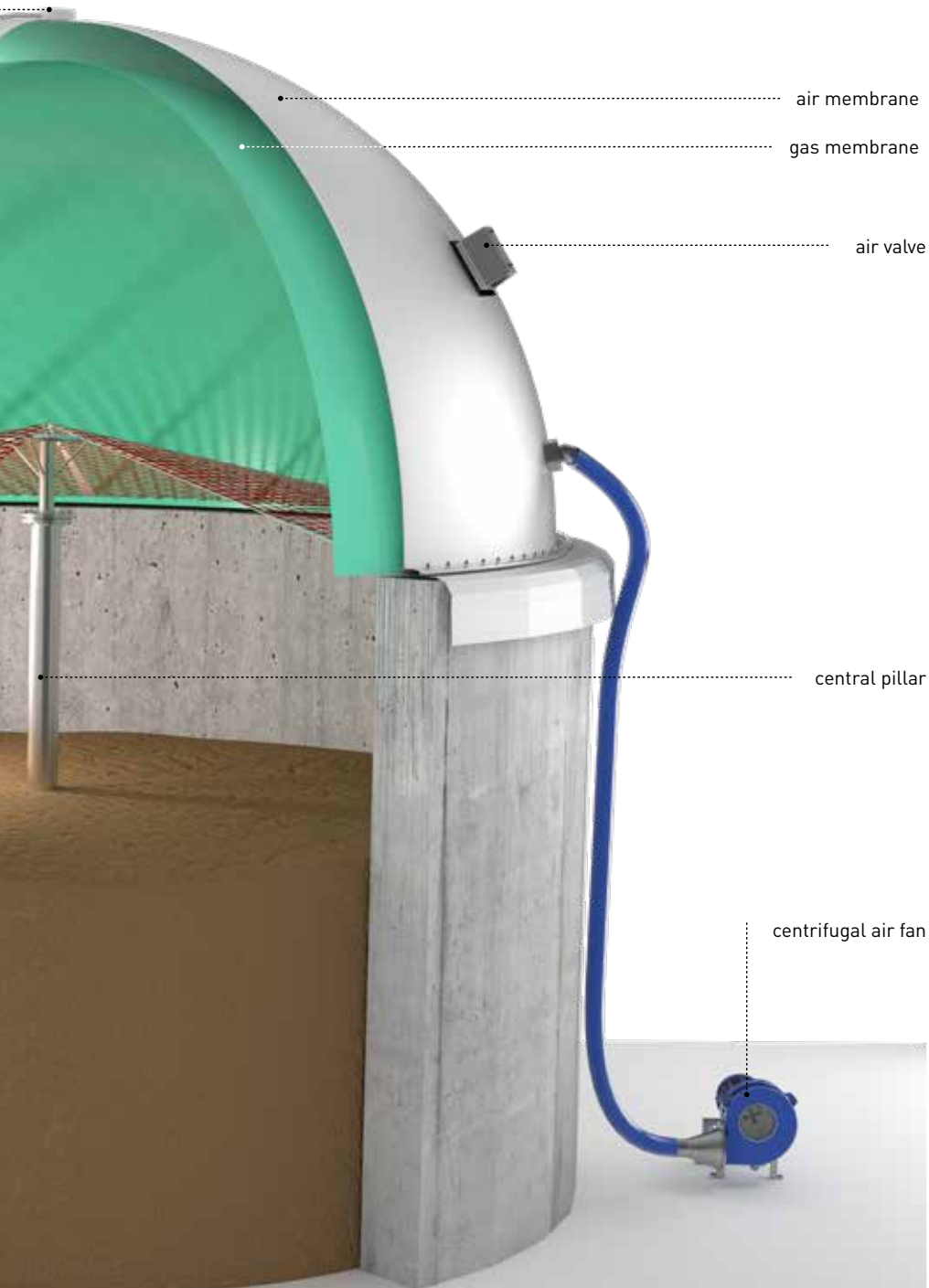
Special high pressure covers can be manufactured with reinforced membranes and oversized welding.

In agricultural biogas plants we have standardized our long tested system made with 2 membranes anchored on the tank top and stabilized at low working pressure by a ventilation system.

A support structure made with plastic ropes and a 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.





volume level sensor

electrical panel

centrifugal air fans



PATENTED

CUPOLA M2

CUPOLA M2 HEAT SHIELD option

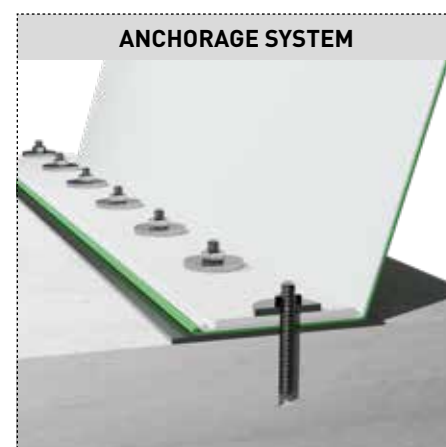
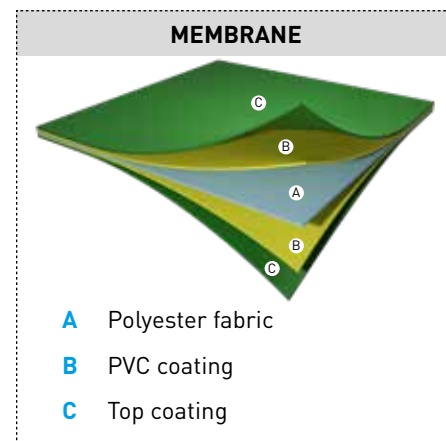
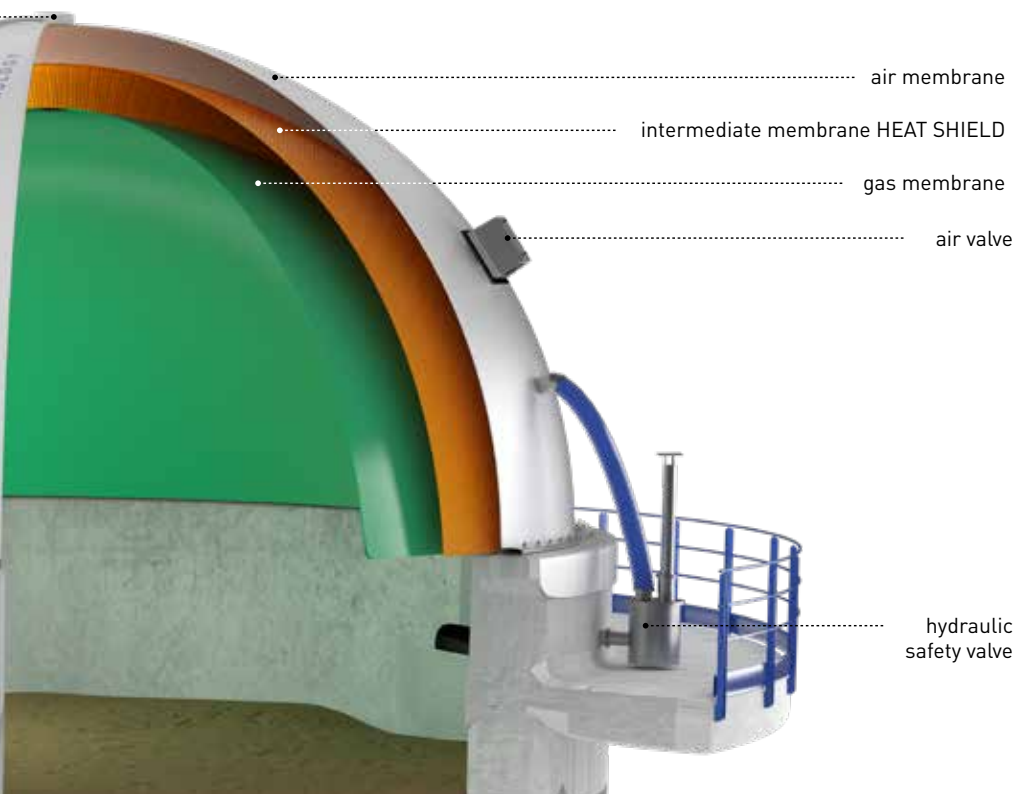
The primary objective of CUPOLA M2 HEAT SHIELD option is to reduce the heat loss from digester at its highest possible level.

SYSTEM DESIGN

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; it is inflated with air.
- The special insulated Heat Shield intermediate membrane, made by a triple layered 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 through 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.



OPTION

HEAT SHIELD®

The CUPOLA M2 HEAT SHIELD option is pressurized by a reduced power air fan running 24/24h and is regulated by a special valve that force the air to enter in the air chamber just in case the pressure in the dome is decreasing. Thanks to this combined system, there is a limited exchange of air in the air chamber with a reduction of heat loss due to less flow of cold air. This effect can be reached only in a triple membrane gasholder, because there is no need for a constant air exchange for safety reason, as a result of physical barrier by the intermediate membrane between the two independent chambers (air and gas).

ADVANTAGE POINTS

**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**.

**Reduced electric consumption**

The "3-membrane" design, as a result of its self-functioning safety system, needs a reduced **electrical power air fan**.

**High passive safety against explosion danger**

insulating membrane layer produces the complete separation between the air and the gas chamber. **Any eventual gas leak** cannot enter into the air chamber, and the formation of explosive mixture is prevented.

**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**.



hydraulic
safety valve

gas membrane

air valve

centrifugal air fan

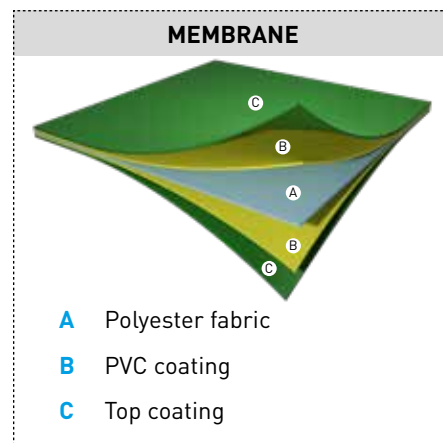


ECONTAINER

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 an internal membrane made with PVC coated polyester fabric that works as a 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 FEATURES

- 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

The 2MASTER system on Platform is made with a single upper membrane, pressurized by an air fan 24 hours a day to give a pneumatic push on the inner biogas chamber, keeping the biogas chamber at a prefixed and constant positive pressure.

This system has a cylindrical shape and it is completely made, 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**





SPECIAL SHAPES

In particular cases we can realize gasholders with special shapes and working in pressure range from about zero to 70 mbar and more.



Rectangular Gasholder

This shape can suit to rectangular existing or projected areas. This design allow **high volume gas storage** in long and narrow spaces.



Other Shapes

Depending to the requests, we can realize **1, 2 or 3 membrane gasholders and gasholder domes** with different shapes.



Cylindrical Gasholder

This model is suitable for high working pressure (up to 70 mbar and more), it **requires reduced civil works and it is installable in tight spaces, in container and closed areas.**

It can be easily transported and relocated, without specific installation works.



H2 MASTER

BREVETTATO

H2 MASTER is the only one realized with membranes that allow to store hydrogen in full safety.

This particular project is patented and suitable to store hydrogen in a low pressure condition (5-30mbar).

H2 MASTER can be useful in electrolysis plant powered by renewable sources.

CARATTERISTICHE PRINCIPALI

- Volume from 10m³ to 10.000m³.
- Installation timing: 1-5 working days;
- Reduced electricity consumption (<1kw/h);
- High security against leaks (patented system);
- Total volume control and easy signal management to the customer's PLC;
- No maintenance;
- Gas flow rate on demand.





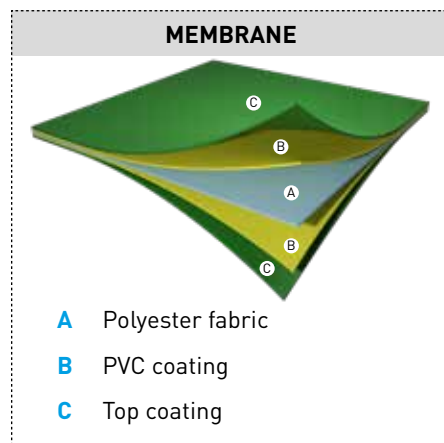
M1 CONE

ODOR-CONTROL COVERS

The CUPOLA M1 CONE 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 to serve as gas storage.

The conic shaped cover is supported by a central mast that ensures the required wind and snow resistance.





FLC MEMBRANE

ODOR-CONTROL COVERS

FLC MEMBRANE 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 MEMBRANE 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.



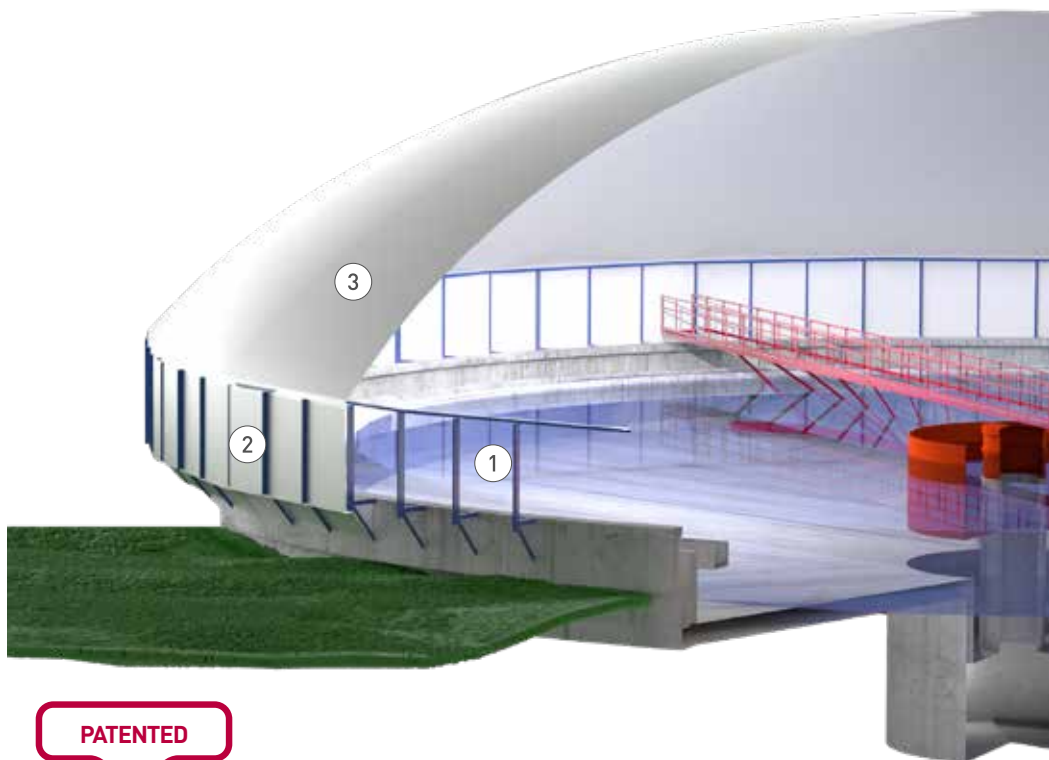
The FLC MEMBRANE covers are installed in a special way to stay constantly stretched on the surface of the slurry, even in the case of variable liquid level in the tank.

The covers capture most of the gas fumes odors by eliminating evaporation and diffusion into the atmosphere.

University research indicates that FLC MEMBRANES 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.





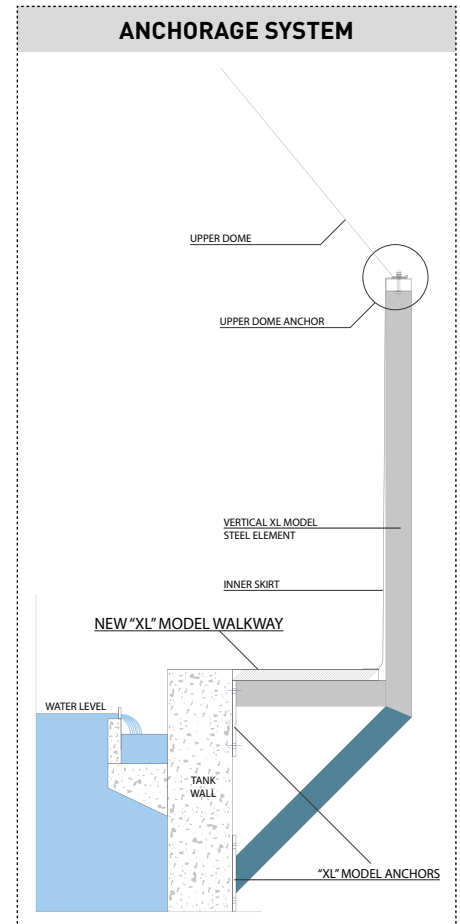
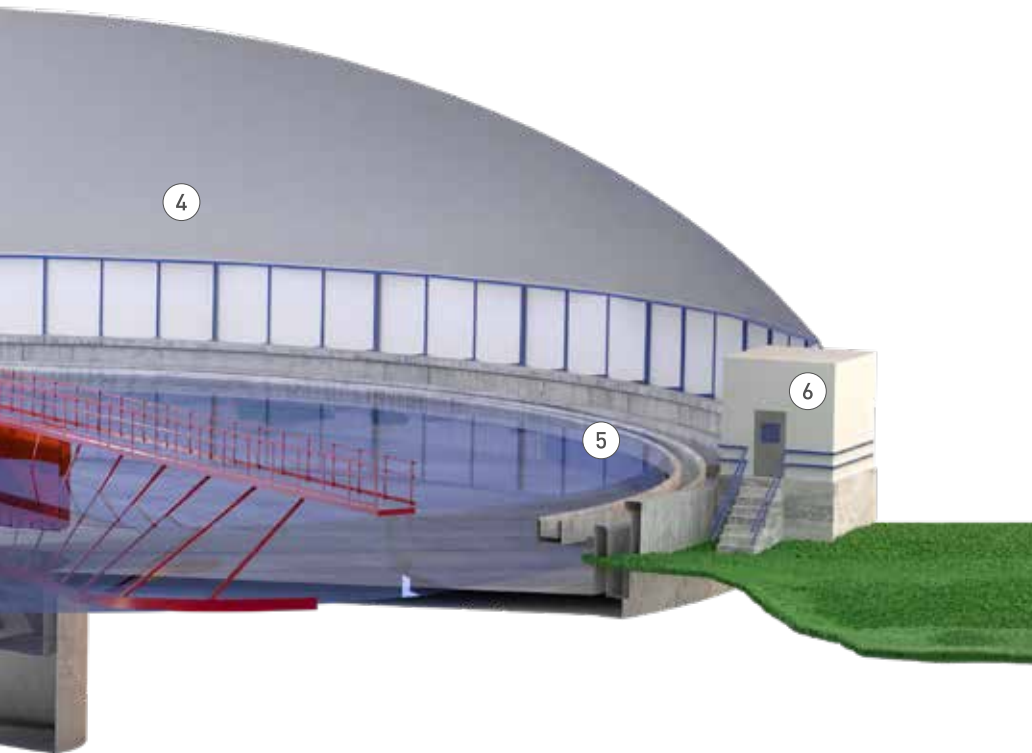
PATENTED

CLARICOVER®

CLARICOVER® is a new and unique solution to cover the primary and secondary clarifier tanks of the waste water treatment plants. It serves to cover the clarifier open tanks in order to capture and then treat the bad smelling gaseous emissions.

The CLARICOVER® system consists of the following main parts:

- ① **The Main supporting structure**, made in stainless steel profiles that have to be anchored to the existing tank external wall.
- ② **A side membrane wall made in polyester PVC coated fabric**. The scope of this part is to make air tight under pressure the support steel structure
- ③ **A pressurized pneumatic spherical cover, made in polyester PVC coated fabric membrane**. The main function of the membrane cover is to collect the bad smelling gases in order to send them to the air cleaning treatment system located downstream the cover.
- ④ **A permeable inner membrane**, located at a fixed height under the pneumatic cover. It has the scope to reduce by at least 3 times the air volume enclosed under the cover that has to be cleaned up.
- ⑤ **Air cover pressurization system**, made with redundant fresh air fans and regulation air valves that continuously replenish with fresh air the flow needed to exchange the gaseous volume enclosed between the water surface and the inner membrane.
- ⑥ **An entrance box** that works as "pressure compensation chamber" between the atmospheric outer pressure and the higher inner one



MAIN ADVANTAGES



It has an **investment cost dramatically lower** if compared with all the existing technical solutions now available (fiberglass reinforced panels, geodetic aluminum covers, etc.)



It allows to cover any round tank up to 200' in diameter as well as rectangular tanks.



It can be **installed in few weeks** even on fully working clarifiers, with low installation costs and a light impact on the existing structures.



It reduces the air treatment needed system with the direct result of a **further cost investment reduction**.



Thanks to the big size access doors the system allows a safe and **full all around accessibility** of the tank to the maintenance personnel.

ACCESSORIES

**HYDRAULIC SAFETY VALVE
WITH ANTI-VACUUM**



HYDRAULIC SAFETY VALVE



**OVERPRESSURE AND
ANTI-VACUUM SAFETY VALVE**



CENTRIFUGAL AIR FAN



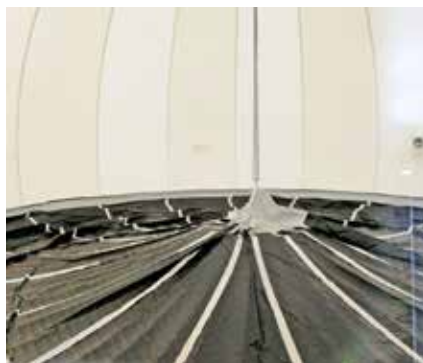
CENTRIFUGAL AIR FANS WITH ELECTRICAL PANEL



AIR VALVE



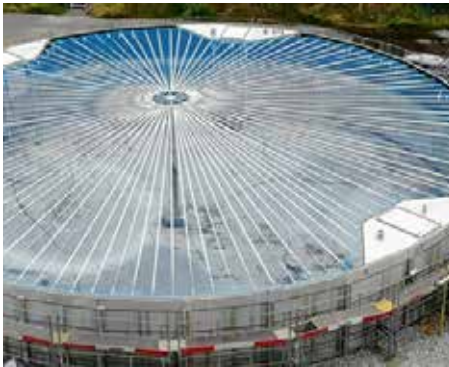
LEVEL SENSOR 4-20 mA



NET SUPPORT SYTEM AND CENTRAL PILLAR



BALCONY



ANCHORAGE SYSTEM



2MASTER · 500m³ · Italia



2MASTER · 1.000m³ · USA



3MASTER · 4.000m³ · Corea del Sud

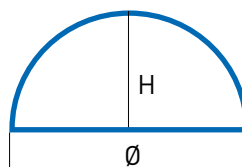


2MASTER · 16.000m³ · Turchia

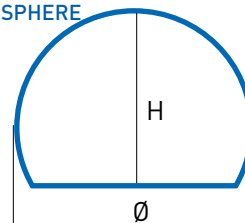


GASHOLDERS

1/2 SPHERE



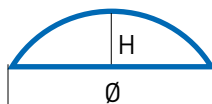
3/4 SPHERE



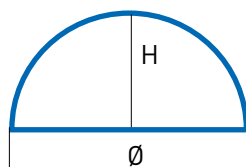
V (m³)	Ø _{max} (m)	H (m)	Ø _{max} (m)	H (m)
10	3,40	2,20	3,20	2,70
30	4,90	2,95	4,50	3,60
50	5,80	3,40	5,20	4,20
80	6,80	3,90	6,00	4,80
100	7,30	4,15	6,50	5,10
150	8,40	4,70	7,40	5,80
200	9,20	5,10	8,10	6,30
250	9,90	5,45	8,70	6,80
300	10,50	5,75	9,20	7,10
400	11,60	6,30	10,10	7,80
450	12,00	6,50	10,50	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



Ø 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	9.318
34,00	8,60	4.040	17,20	10.194
35,00	8,85	4.412	17,70	11.123
36,00	9,10	4.805	18,20	12.107
37,00	9,35	5.222	18,70	13.147
38,00	9,60	5.661	19,20	14.245
39,00	9,85	6.125	19,70	15.403
40,00	10,10	6.613	20,20	16.621

Cupola M3 Heat Shield - ø 22m - Italia



Cupola M2 - ø 28m - Turchia



Cupola M2 - ø 32m - UK



Cupola M2 - ø 36m - Italia



THE BIGGEST GASHOLDER IN THE WORLD!



Type:

**2MASTER DOUBLE
MEMBRANE GASHOLDER**



Green Energy Industrial Plant in Ottana
(NU), Sardegna Region

Volume	32.000m ³
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External Volume	35.000m ³
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Working Pressure	4 mbar
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Dimension

length 76m - width 36m - height 18m





OUR PLANTS IN THE WORLD

Canada
USA
Mexico
Honduras
Colombia
Ecuador
Peru
Chile
Argentina

Brazil
Morocco
Tunisia
South Africa
Russia
Iran
India
Japan
South Korea

Vietnam
Malaysia
Philippines
Indonesia
New Zealand
Nepal
Israel
China
Thailand

OUR PLANTS IN EUROPE

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United Kingdom
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Germany
Belgium
France

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Portugal
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Czech Republic
Poland
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