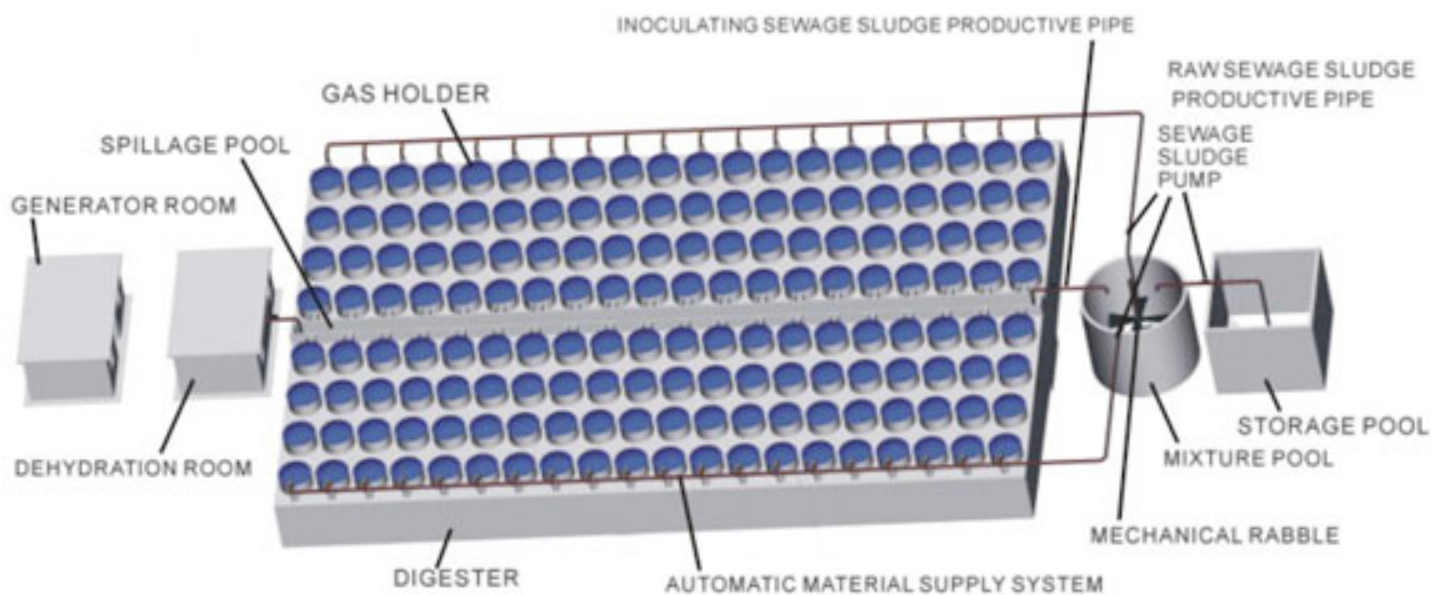




Puxin Biogas Plants

Puxin family size and medium size biogas systems.



Biog & Puxin Biogas Plants

We have our superiority in consummate hydraulic pressure biogas system and convenient construction solutions, as we have developed a new type gas plant featuring easy operation, easy maintenance, fast initial gas producing. Our plants are well reputed in the biogas industry with durable quality of products, excellent safety and the low cost.

The following are the biogas system.

1. **Puxin medium size biogas system:** The medium size biogas system is composed of one or a group of 100 m³ biogas plants formed into a unit, the pipes system, the gas purification system and the appliances or electricity generator. The medium size biogas system is mainly applied to the livestock (pig, cow, etc.) plants to treat the waste, or applied to public buildings (hotel, apartment, etc.) to treat sewage and organic food waste.

2. **Puxin family size biogas system:** The family size biogas system is composed of one or several 10 m³ biogas plants formed into a unit, the pipe system, the gas purification devices and the appliances. The family size biogas system is mainly applied to family house to treat sewage and organic food waste.

For those two type biogas systems we sell all the equipments and products needed to build the biogas system to our customers, train the technicians for them, and we or our customers can build the biogas application system themselves.

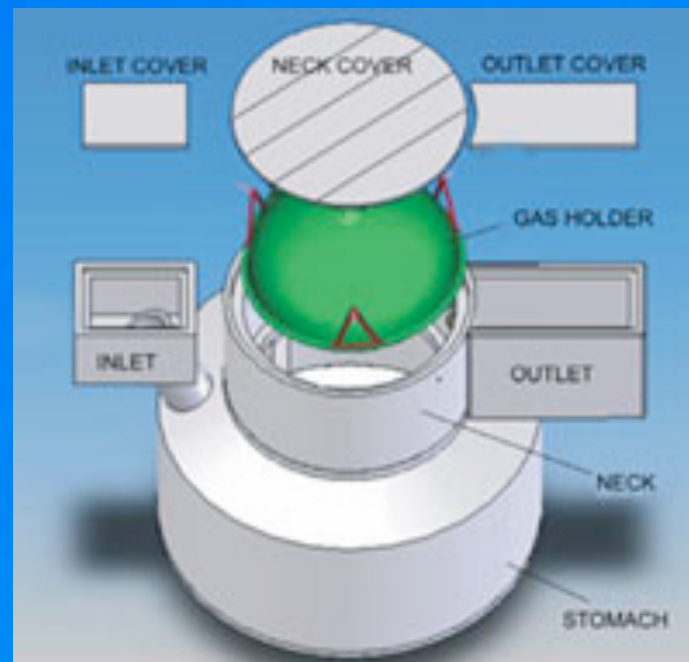
Our products for building a biogas plant include: the steel mould that is equipment used to build the concrete digester of the 10m³ biogas plant, the glass fiber gasholder that is a component of the 10m³ Puxin biogas plant, the pipeline, the biogas appliances (stove, water heater, rice cooker, lamp etc.) and small power biogas generators.

The steel mould is composed of a number of steel mounding boards. By using a steel mould a 6 or 10 m³ biogas digester can be build in two days, or 150 in a year. The steel mould is reusable and can be used over 2000 times and lasts over ten years.

The glass fiber reinforced plastic gasholder is 1.0-1.2 m³ that is one of the main components of the Puxin biogas plant, and it can last over 10 years.

The Structure

Puxin Biogas Plant is of the hydraulic pressure biogas plant type, and is composed of a concrete digester and a glass fibre reinforced plastic gasholder. The digester has a capacity of 6 or 10 cubic meters, and is constituted by a stomach, a neck an inlet and an outlet. The gasholder is 1.6 m in diameter, 1 or 1.2 cubic meter in capacity. The gasholder is installed within the digester neck, fixed by a component; the gasholder and the digester are sealed up with water.



Comparing with the traditional fixed dome type hydraulic Biogas plant, Puxin Biogas Digester has the following distinct advantages:

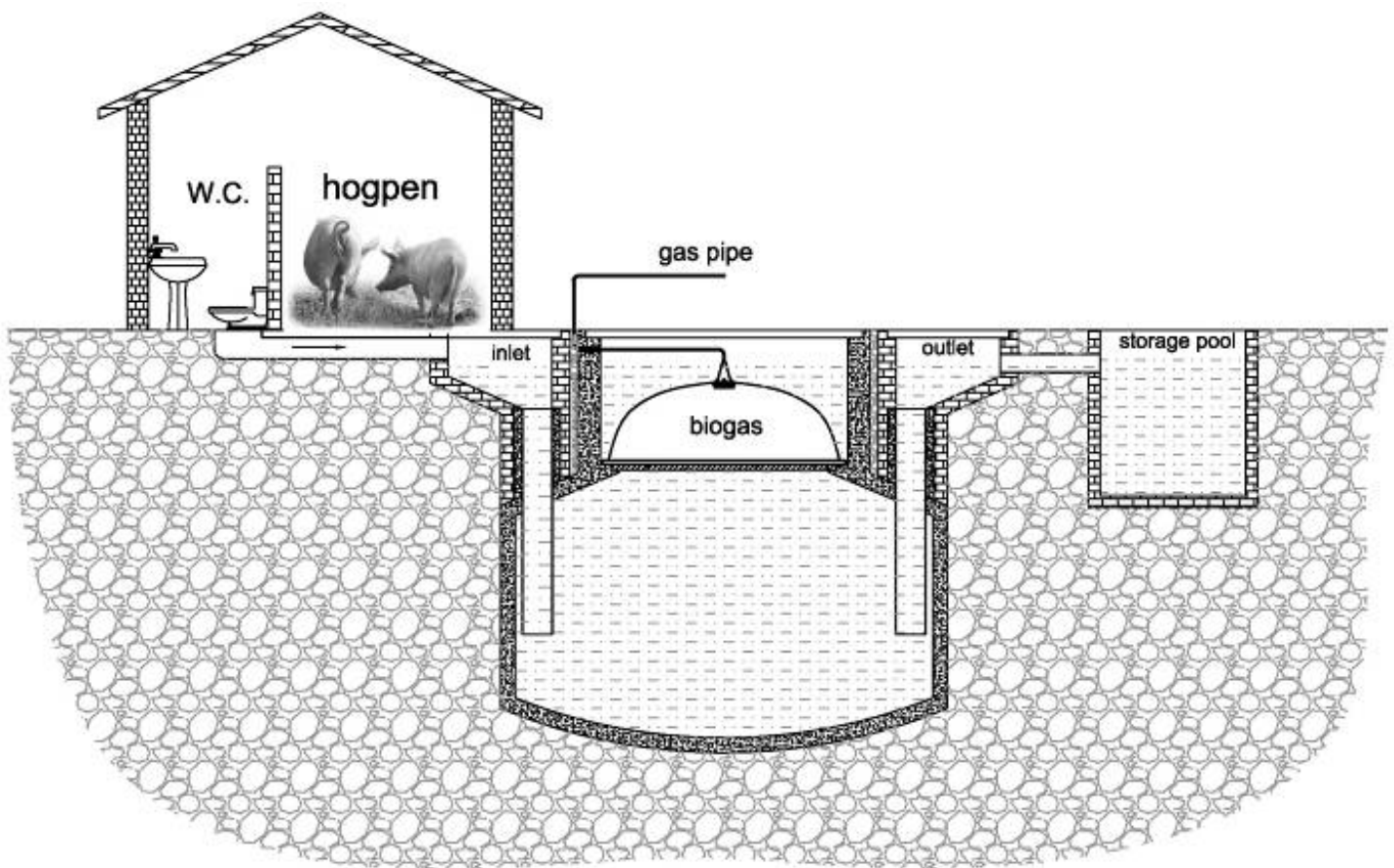
Easy to build and 100% success rate: The construction of Puxin Biogas Plant is exempt from the difficult airtight craft, so the technical difficulty is greatly decreased, and the construction period is greatly shortened. To build a Puxin Biogas Digester successfully, the constructors are only required to master how to assemble and disassemble the steel mould. Any workman can learn to build Puxin Biogas Digester within a day and with 100% success rate.

Part one Preparation

Step1

Choosing location

The digester should be constructed near and below the lavatory and hog pen or cowshed, so that the waste can flow into the digester automatically.



Part two Construction of the digester

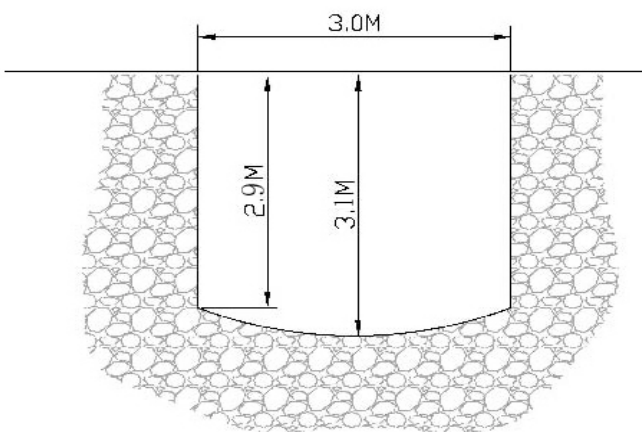
Step 2

Preparing construction materials

Cement (grade above 325) 1200kgs; Sand: 3.0m^3 ; Scree : 3.0m^3 ; Brick($60\times 120\times 240\text{mm}$)200 pieces;

Reinforced steel bar($\Phi 6-8\text{mm}$)20kg.%%c150MM PVC pipe (L1350MM 1pc, L1250MM 1pc

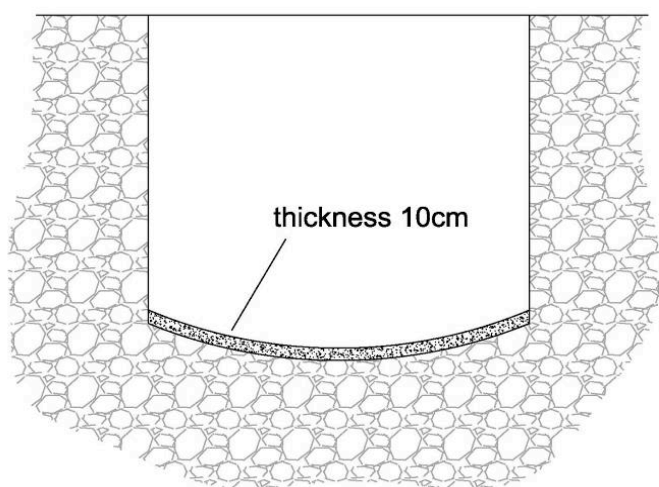
Step 1 Dig a hole in the ground (diameter 3.0m and depth 3.1m)



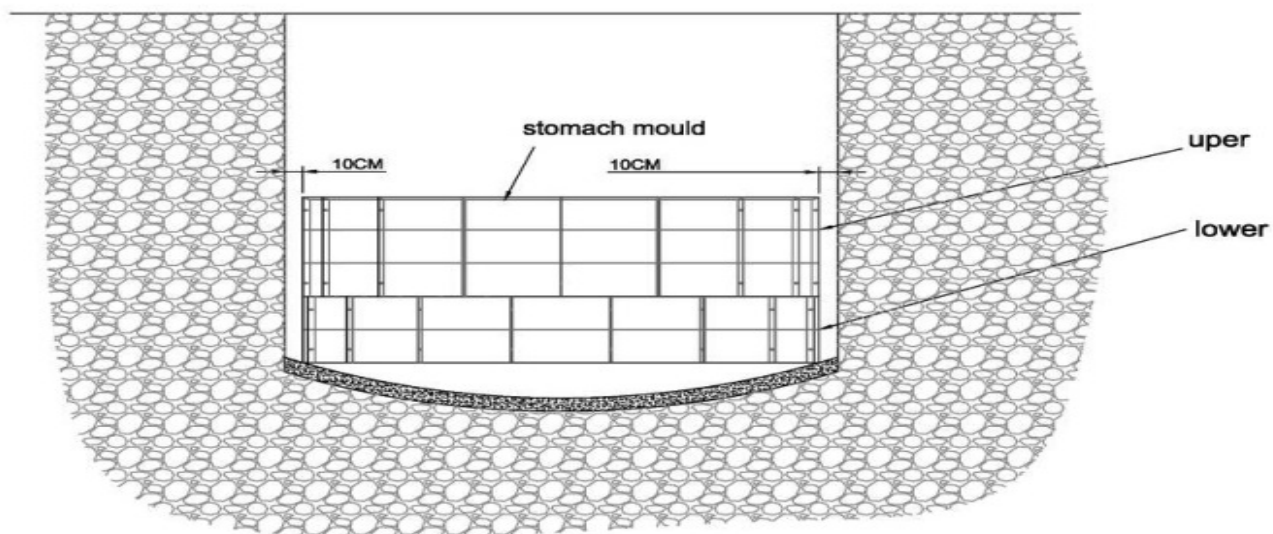
Part two Construction of the digester

Step 2

Cast the basement (thickness 10cm)



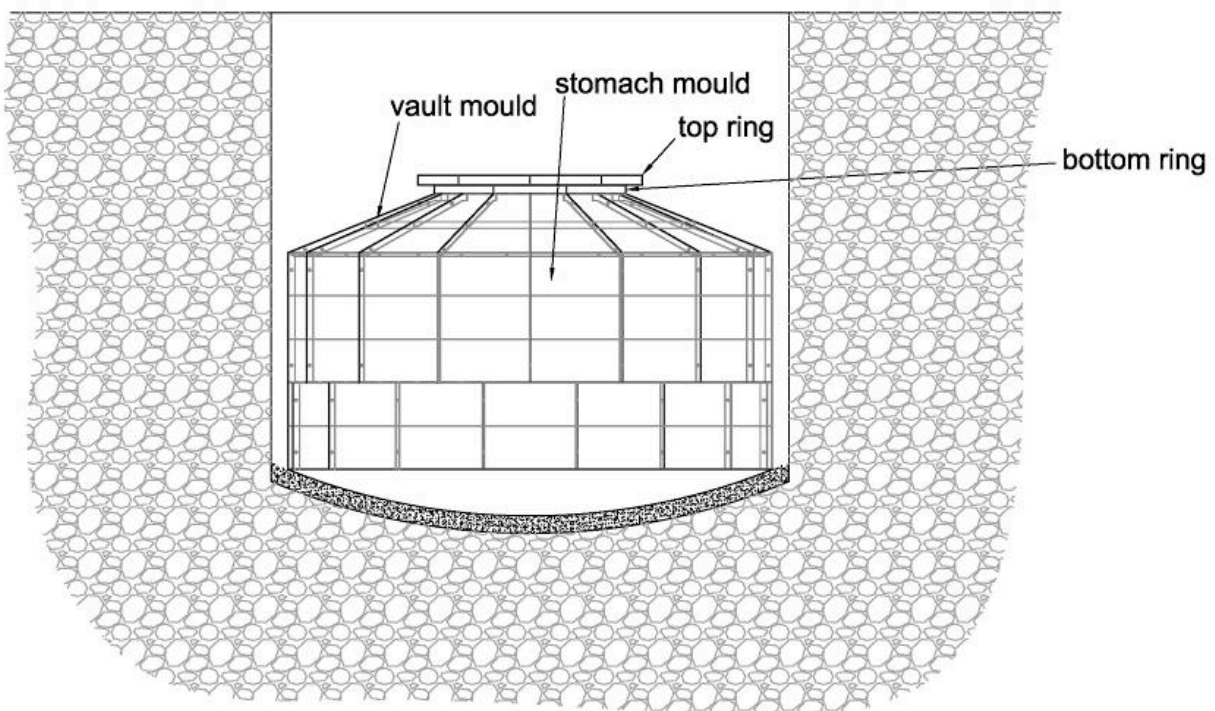
Step 3 Assemble the stomach mould



Part two Construction of the digester

Step 4

Assemble the vault mould Install the top and bottom rings

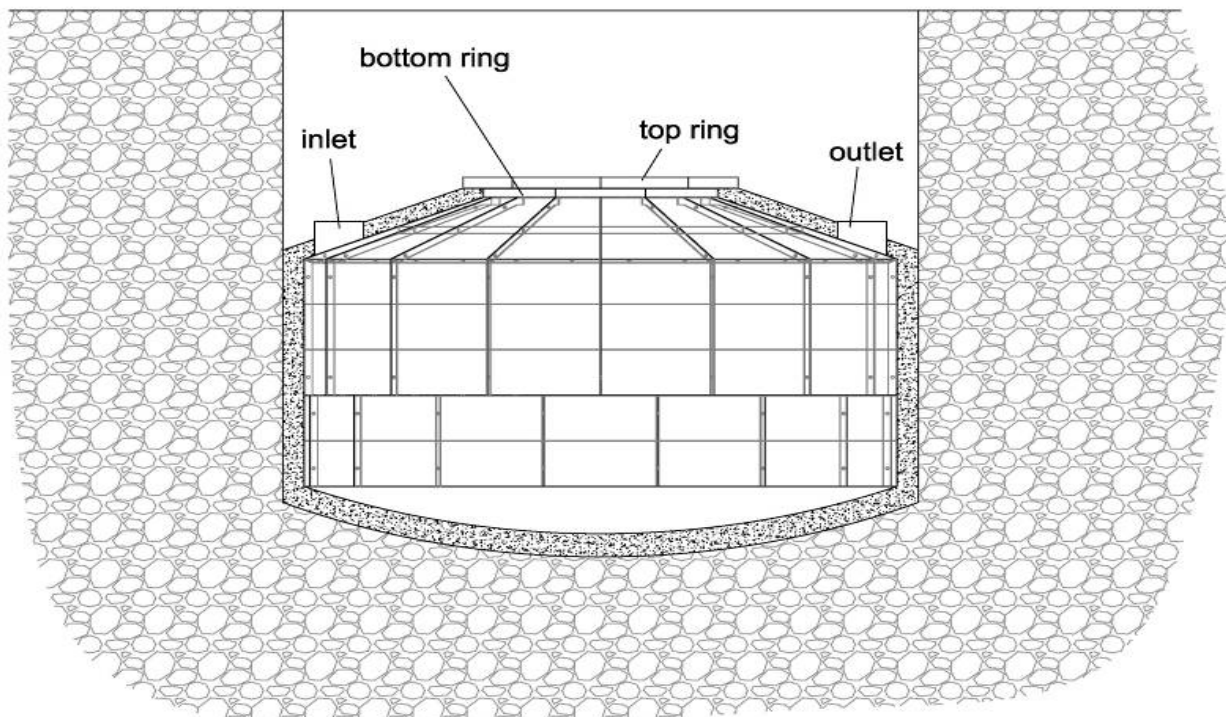


Part two Construction of the digester

Step 5

Cast the digester stomach

Attention: Make the mould soggy before casting. Cast evenly and symmetrically.



Part two Construction of the digester

Step 5

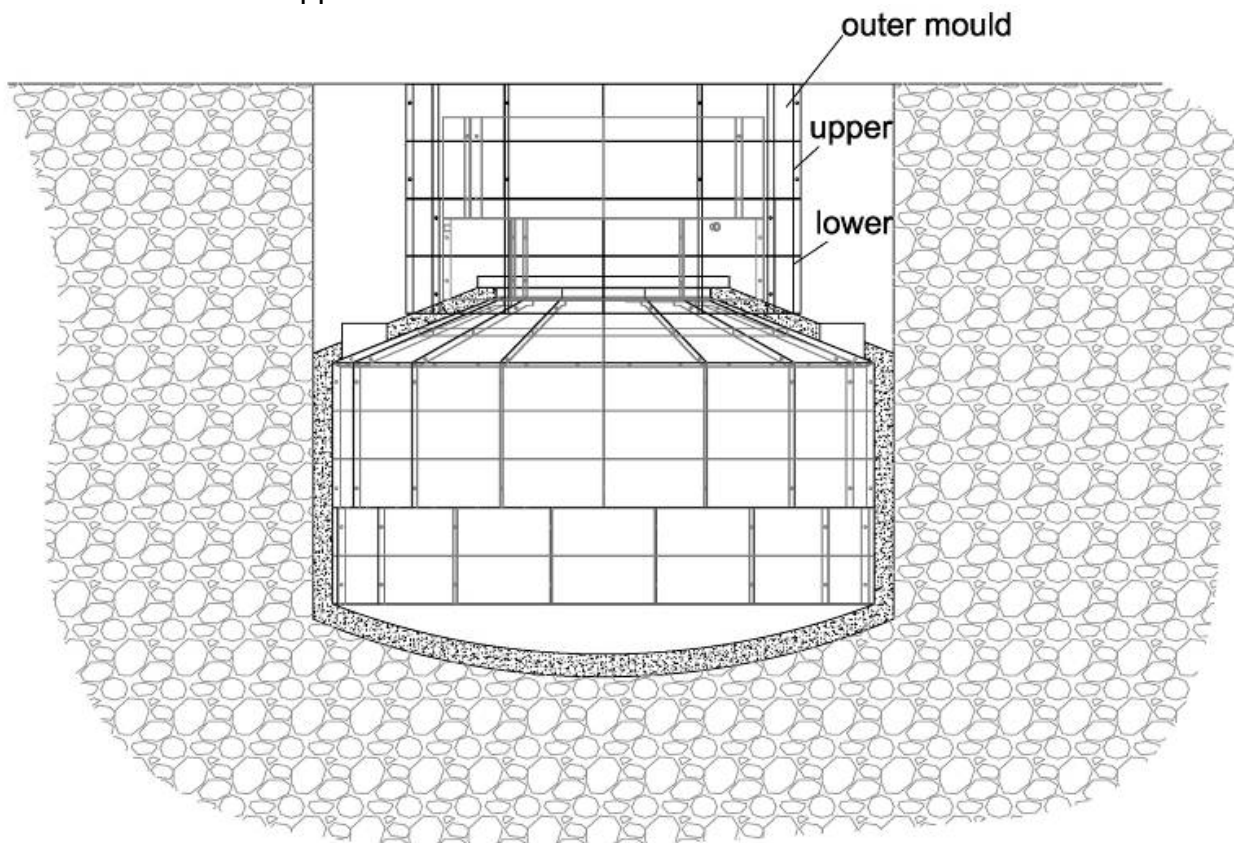


Part two Construction of the digester

Step 7

Assemble the neck outer mould

Attention: The neck outer mould is composed of two parts (upper and lower),
The upper and lower must be connected in dislocation.

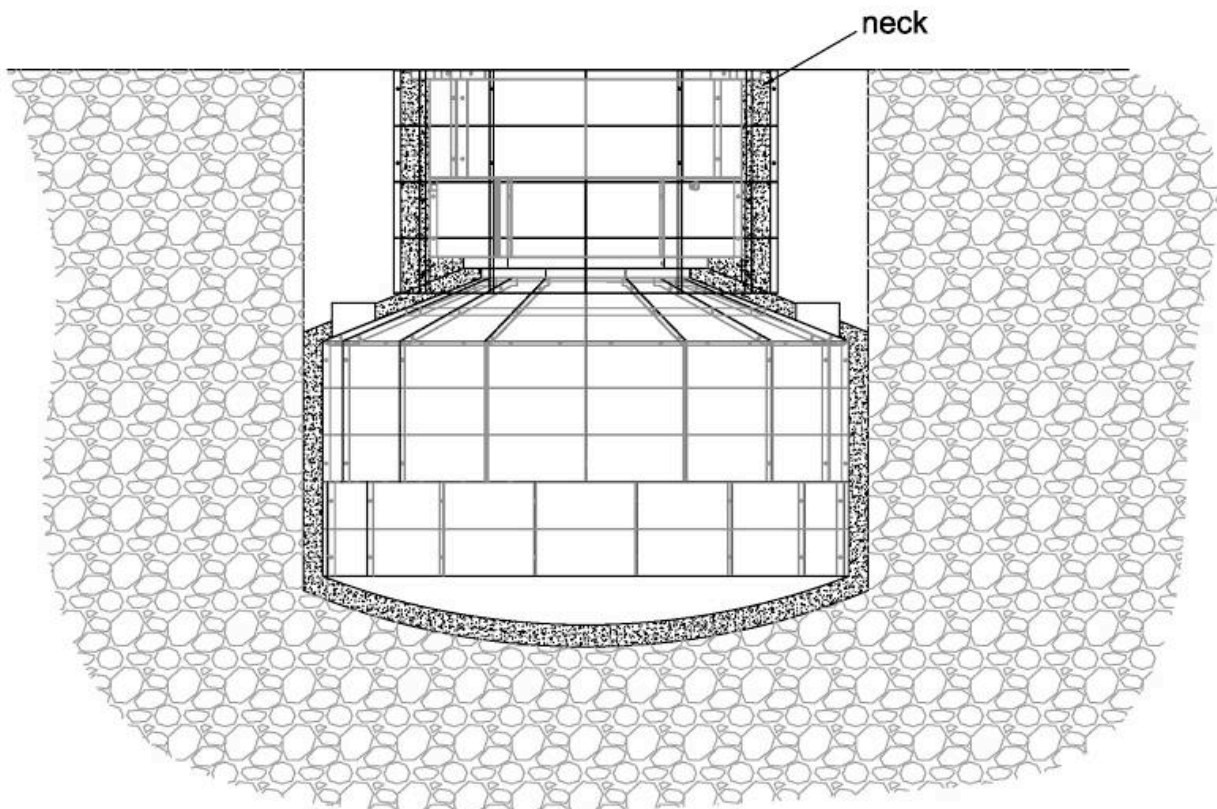


Part two Construction of the digester

Step 8

Cast the digester neck

Attention: A hole for the gas pipe pass through, and three cavities used to fix the gas holder must be left in the neck of the digester.



Part two Construction of the digester

Step 8

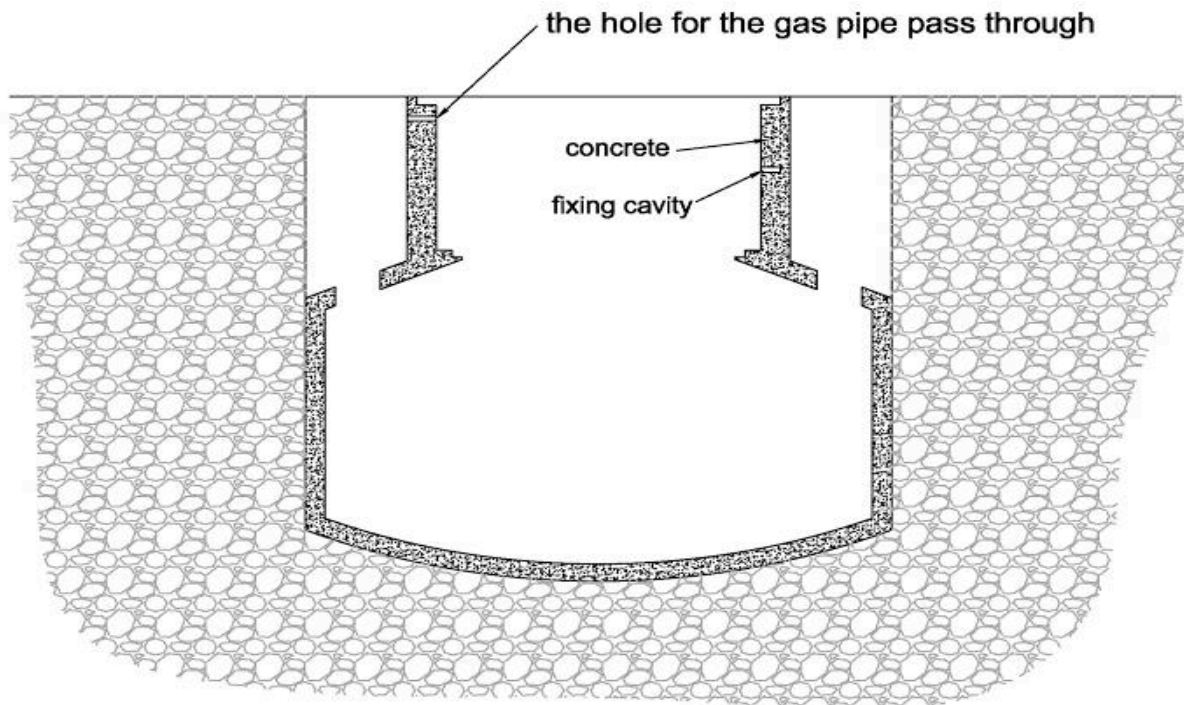


Part two Construction of the digester

Step 9

Disassemble the mould

Attention: The neck mould is allowed to disassemble, only after at least 24 hours of the finish of the casting. First disassemble the neck outer mould, and then disassemble the neck inner mould. The vault and stomach mould are to be disassembled, after at least 48 hours of the finish of the casting. First disassemble the vault mould, and then disassemble the stomach mould.

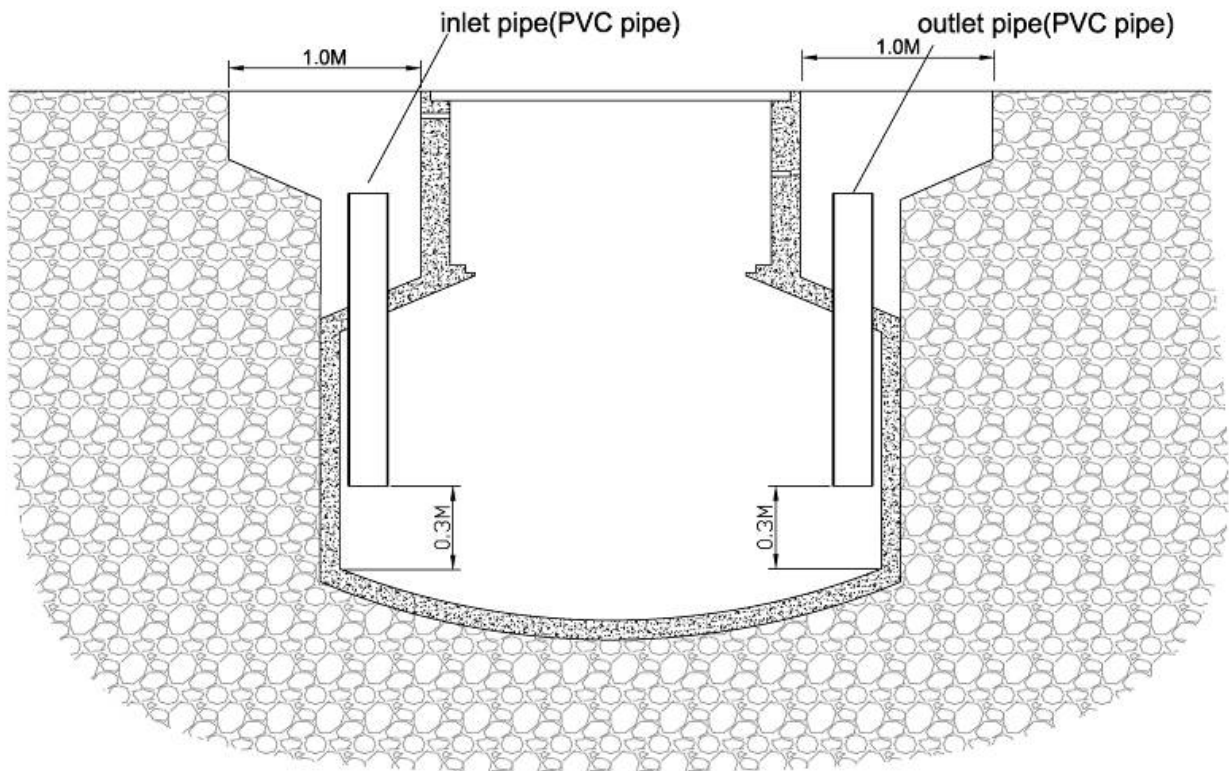


Part two Construction of the digester

Step 10

Install the inlet and outlet pipes

Attention: The joints between the stomach and the inlet and outlet pipe must be sealed with cement to stop water leaking.



Part two Construction of the digester

Step 10

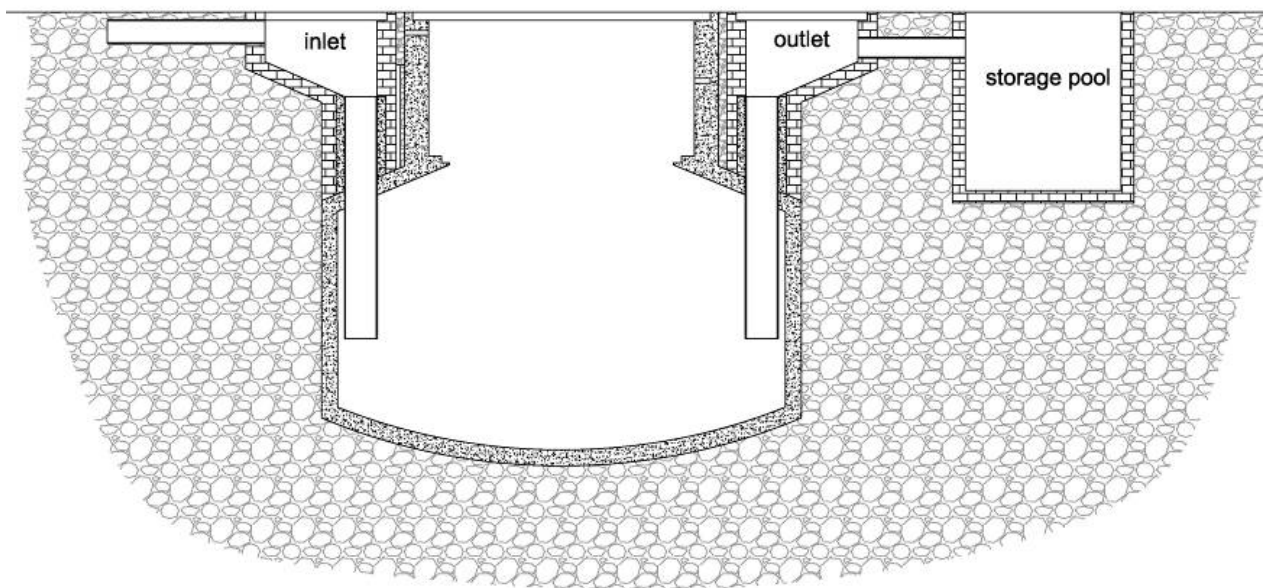


Part two Construction of the digester

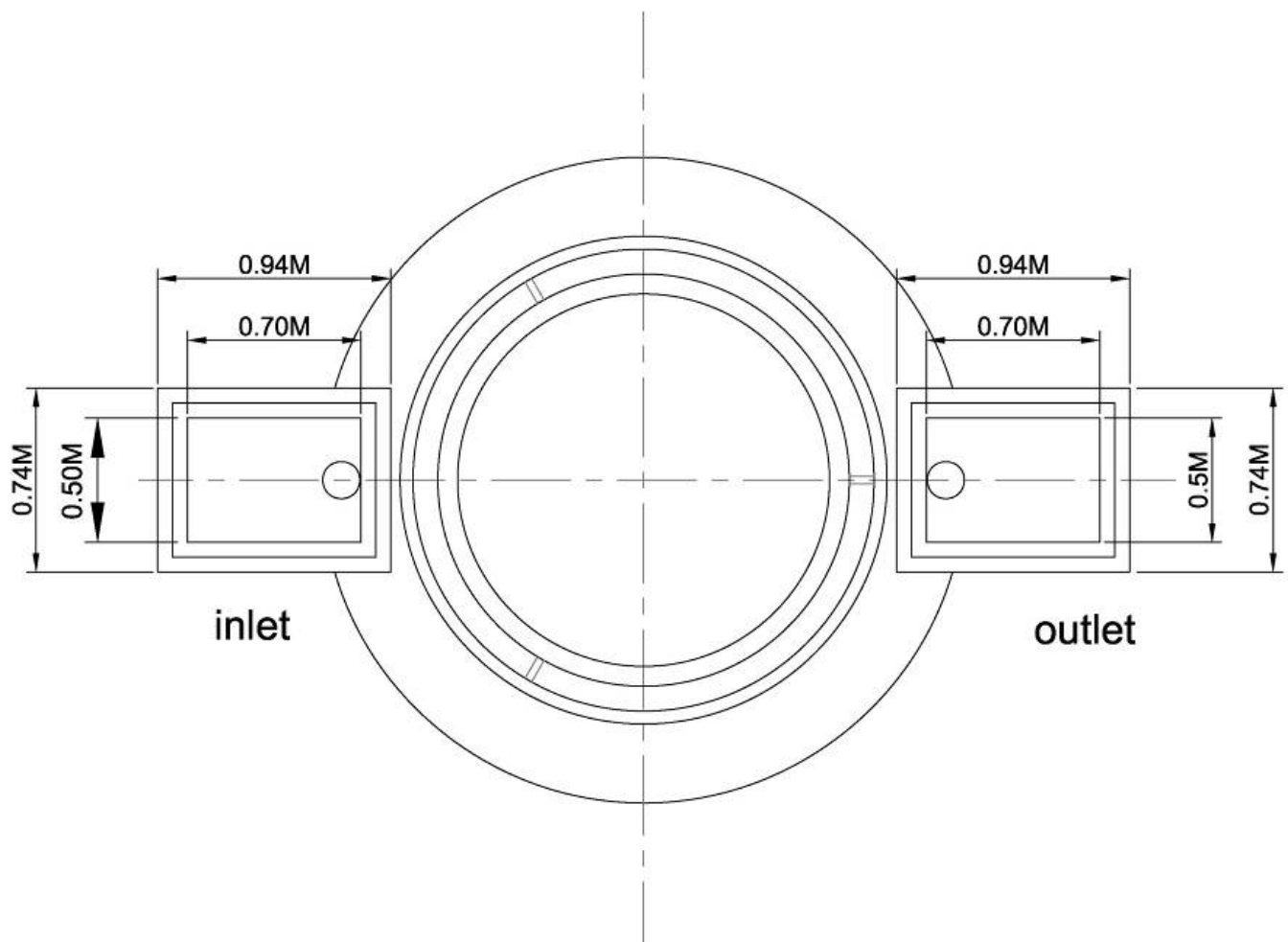
Step 11

Build the inlet and outlet

Attention: The inlet and outlet is build with bricks, and the faces inside the inlet and outlet must be covered with a layer of cement of 1CM thickness. The inlet is at least 20CM higher than the outlet, so that the waste can automatically flow into the digester through the inlet and flow out from the digester through the outlet by gravity.



Step 11

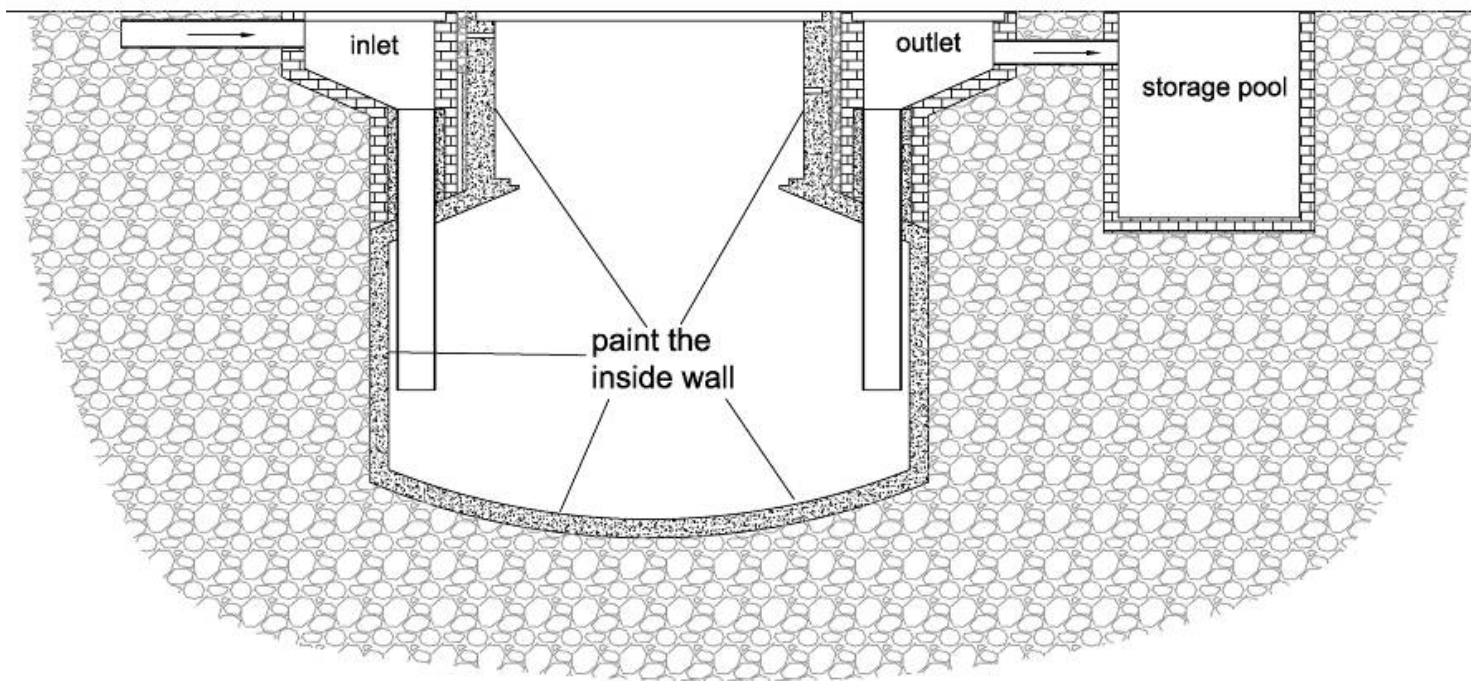


Part two Construction of the digester

Step 12

Paint the digester

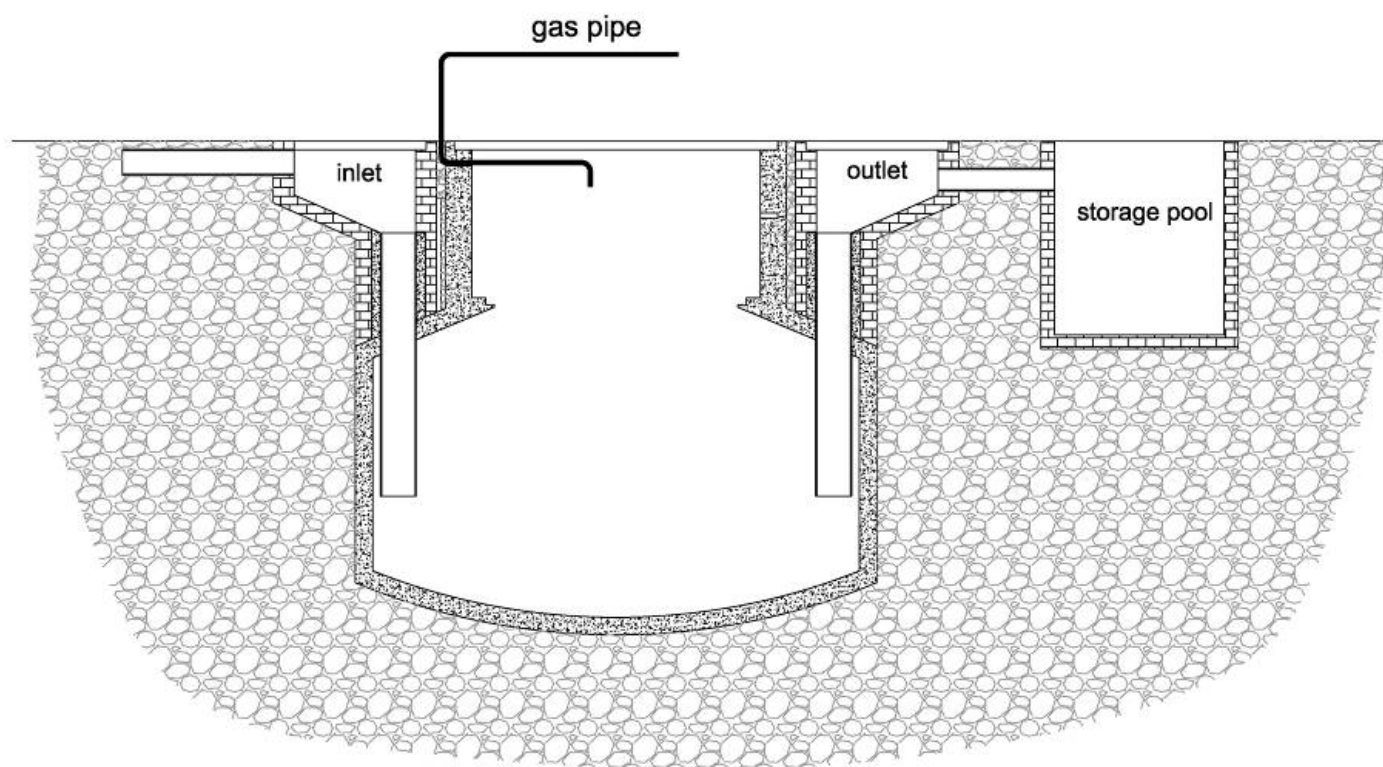
Paint the face inside the digester over with liquid cement 1-2 times made sure there is no small hole on the face.



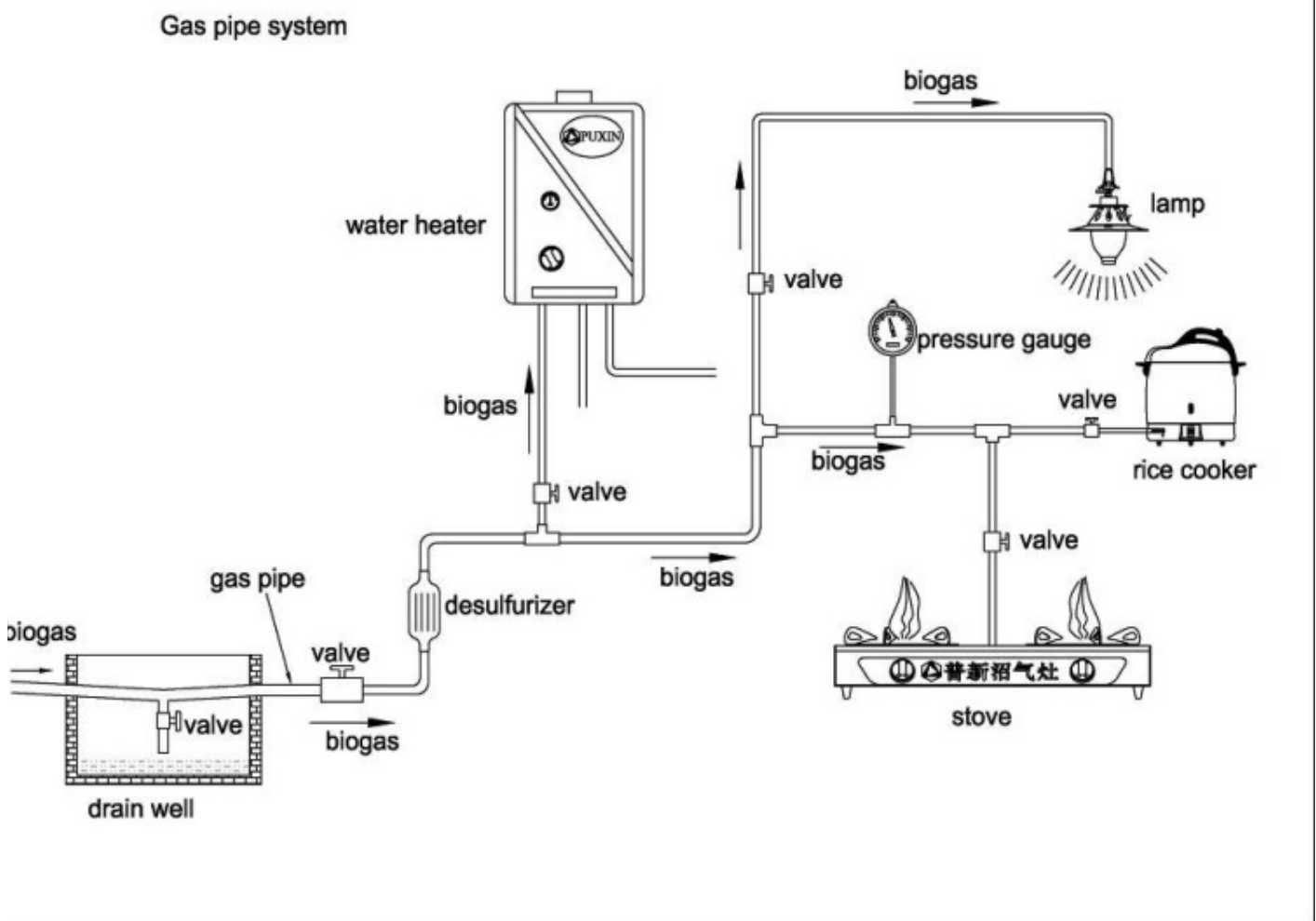
Part two Construction of the digester

Step 13

Install the gas pipe system and the appliances



Part two Construction of the digester

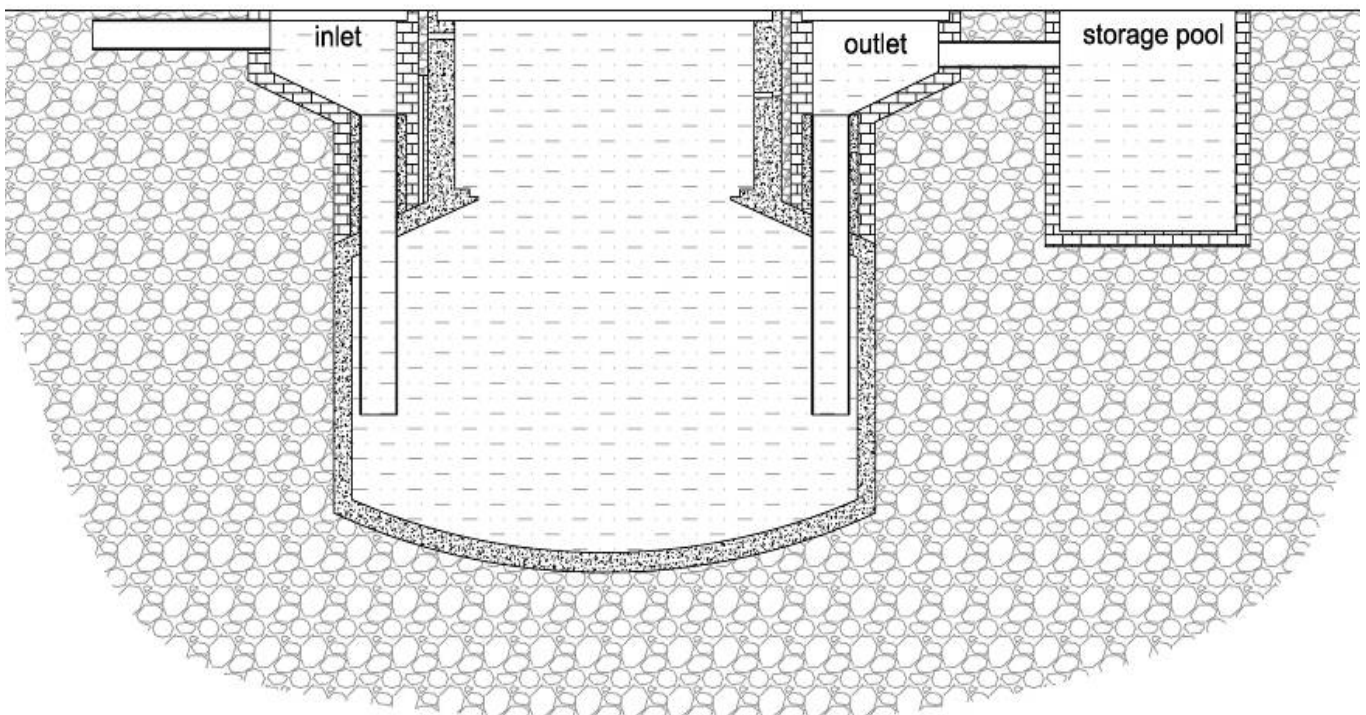


Part three checking

Step 1

Water leaking test

After three days of the completion of the digester, fill the digester with water, if the digester is leaking, get the water out from the digester, find out the leaks and seal them with cement.

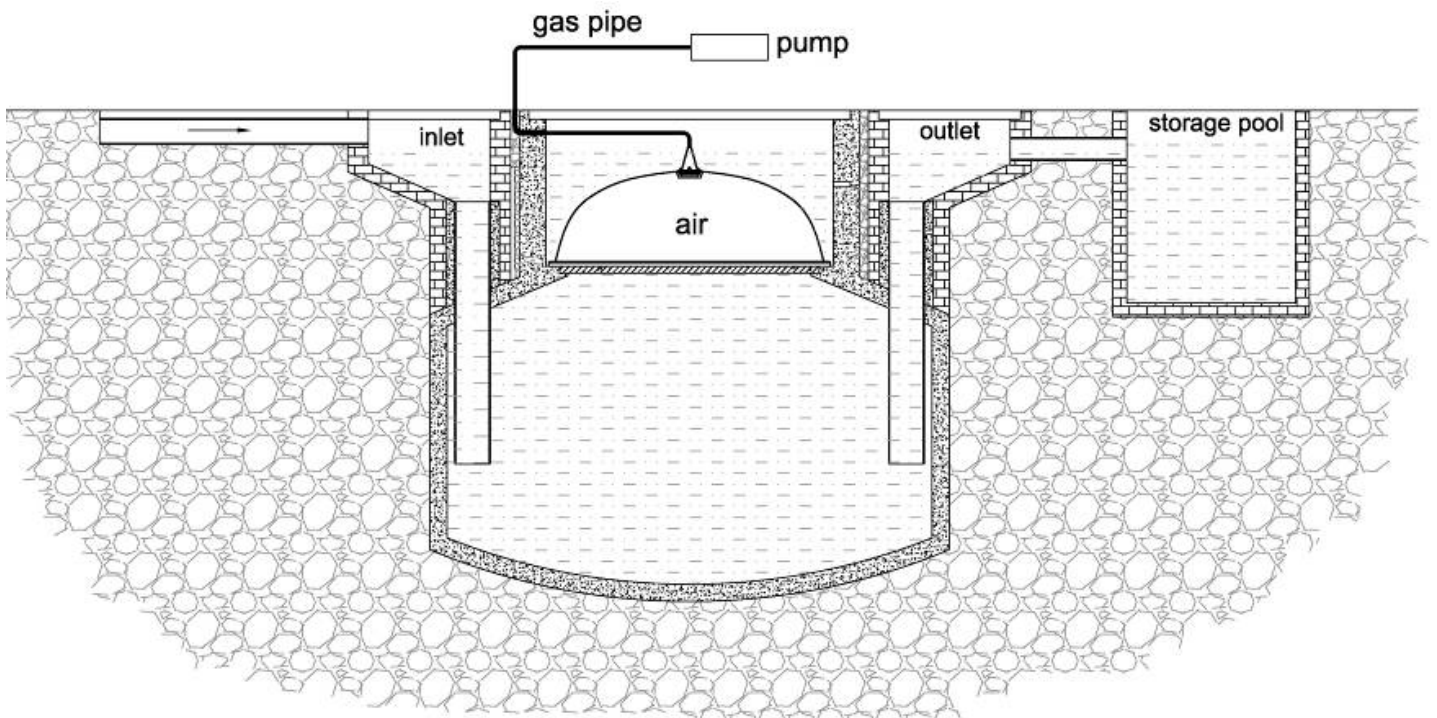


Part three checking

Step 2

Gas leaking test

Fix the gasholder in the digester neck, the pump air into the gasholder until the gasholder is full of air. If there is no air bubble from the gasholder, the gasholder is OK. If the gasholder is leaking, find out the leaks and seal them with resin glue inside the gasholder.



Part three checking

Step 2

Gas leaking test



The contrast of the technical requirements for the builders

Items.	Traditional fixed dome type hydraulic Biogas plant.	Puxin Biogas Plant
Airtight craft.	Highly required (the airtight ability of the concrete gas-case is decided by the technical level of the builder)	Not required (the airtight ability of the glass fibre reinforced plastic gasholder is guaranteed by the manufacturer)
Ability of understanding the blueprint	Highly required (built by technical hand according to the blueprint)	Not required (cast by mould).
Ability to build the arch	Highly required (built by technical hand)	Not required (cast by mould)
Control of the construction and sizes	Highly required (built by technical hand)	Not required (cast by mould)
To judge and deal with gas leaking	Highly required. Difficult to judge gas or water leaking; difficult to find the leak; need to take out all the fermentation material to enter into the biogas digester to paint and seal again.	Lowly required. The gas leak can be seen. The gasholder can be taken out from the digester and repaired on ground.
To judge and deal with water leaking	Highly required. Difficult to judge gas or water leaking; the small outlet of the biogas digester makes it hard to repair the leak in the biogas digester	Required. Easy to judge gas or water leaking; the big outlet of the digester makes it easy to repair the leak.
Training period	About 3 months	About one week
Period to become a proficient builder	1—2 years	About one month
Requirement of the trainee	Certain education, excellent ability to master skills	With or without education, ordinary ability to master skills
Success rate.	Less than 100 %	100%

The Contrast of the construction period

Item	Traditional fixed dome type hydraulic Biogas plant	Puxin Biogas Plant
Time to build the concrete digester	4 days	2 days
Time for the airtight work	7 days	0 day (no such work)
Finish the airtight test	2 days	0 day (no such work)
Time total	15 days	2 days

The Contrast of fermentation materials allowed

Fermentation materials	Traditional fixed dome type hydraulic Biogas plant	Puxin Biogas Plant
Fluidities (eg. animal or human wastes)	yes	yes
Solids (eg. Straw, grass)	no (because difficult for replacement)	Yes (because easy for replacement)

Contrast of the maintenance

Fermentation material	Traditional fixed dome type hydraulic Biogas plant	Puxin Biogas Plant
Repairing the gas leak of the plant	Dangerous and difficult; Hard to find the leak; Must do repairing inside the biogas digester; Liable to poisoning due to the narrow opening (0.5m diam) and poor ventilation; Must take out all fermentation material, scrape the old painting layer and repaint the gas-case, Almost unworkable	Safe and easy; Can do repairing on the ground; No poisoning; Can see the leak and mend it directly.
Repairing the water leak of the digester	Dangerous, Hard to judge water or gas leak; Must do repairing inside the biogas digester; Small digester outlet and poor ventilation; Liable to poisoning.	Safe. The digester neck <u>outlet</u> is large enough (1.5m diam) to ensure good ventilation; No poisoning even working inside the digester.

Relationship between the volume of biogas plant and the livestock keepers

Item	unit	pig	cow	Sheep	Chicken
Daily Feces	kg	3.0	15.0	1.5	0.1
Dry material content	%	18	17	25	30.0
a 6m ³ biogas plant		5	1	20	167
a 8m ³ biogas plant		7	2	28	222
a 10m ³ biogas plant		8	3	32	278

Raw material needed to produce 1 cubic meters biogas

raw material	Water content (%)	Dry material gas production rate (m ³ /kg)	raw material needed to produce 1 cubic meters biogas (kg)	
			Dry material	Fresh material
Pig Manure	82	0.25	4.00	22.23
cow Manure	83	0.19	5.26	30.95
Chicken Manure	70	0.25	4.00	13.34
Human Manure	80	0.30	3.33	16.65
Rice Straw	15	0.26	3.84	4.52
Wheat Straw	15	0.27	3.70	4.36
Corn stalks	18	0.29	3.45	4.21
Water Hyacinth	93	0.31	3.22	46.00

Raw material parameters

Raw material	C%	N%	C: : N	Methane content of biogas produced (%)	Gas duration (d)	Dry material content (%)	Dry material biogas production rate (L/.KG)	Raw material biogas production rate (L/.KG)
Dry Wheat Straw	46	0.53	87:1	59		82	425	348
Dry Rice Straw	42	0.63	67:1	61		83	409	340
Corn stalks	40	0.75	53:1	53~59	90	80	412	
Fresh grass	11	0.54	26:1	70	60	24	455	107
Fresh Sheep Manure	16	0.55	29:1					
Fresh cow Manure	7.3	0.29	25:1	50~60	90	17	205	35
Fresh Pig Manure	7.8	0.60	13:1	65	60	18	425	77
Fresh Human Manure	2.5	0.65	2.9:1	50	30	20	426	85
Fresh Horse Manure	10	0.24	24:1	60	90		279	

Biogas appliances and fittings

The following data are basis on **theoretical value** Take 100 kg pig manure for example, according to the above table Calculating:

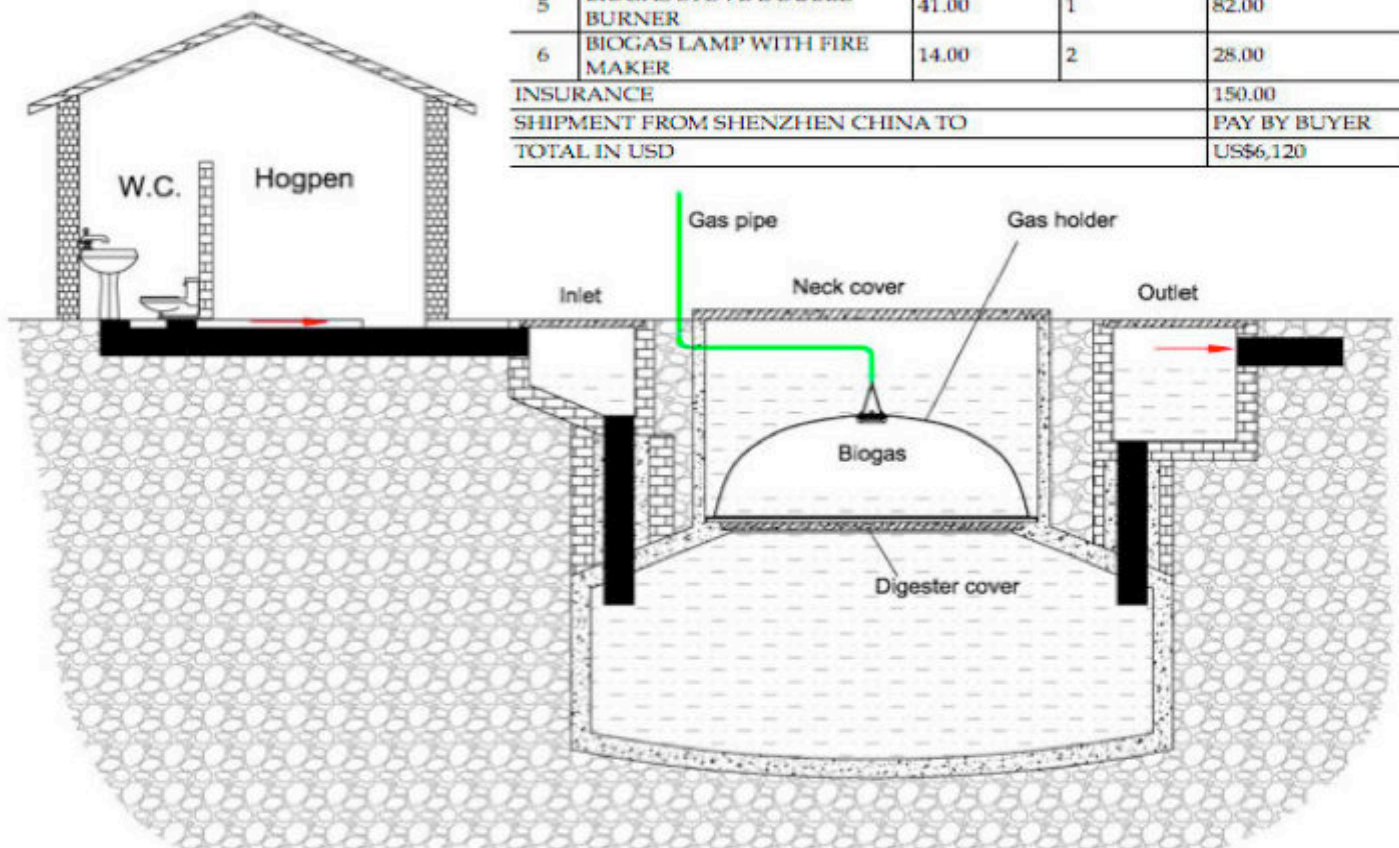
Waste * (1- A) * B -----→ $100 * (1-82\%) * 0.25 = 4.5 \text{ m}^3 \text{ biogas}$ So 100 kg pig manure can be produce about 4.5 m³ biogas

Data: 1 10 m³ puxin biogas systems can generate 5 m³ biogas if the waste is enough,

2 23 kg pig manure can produce 1 m³ biogas——→ $23 * 5 = 115 \text{ kg pig manure}$ 30 kg cow manure can produce 1 m³ biogas——→ $30 * 5 = 150 \text{ kg cow manure}$

So the suitable quantity of dung which 10 m³ biogas plant needs is **115 kg pig manure or 150 kg cow manure**.

FOR 1 SET OF PUXIN 6M3 FAMILY SIZE BIOGAS PLANT				
ITEM	DESCRIPTION	UNIT PRICE	QTY/PCS	AMOUNT(USD)
1	STEEL MOULD WITH OUTER 10M3	5390.00	1	5,390.00
2	GASHOLDER 1.0 M3	298.00	1	298.00
3	BIOGAS FITTING	38.00	1	72.00
4	BIOGAS RICE COOKER 2L	51.00	1	102.00
5	BIOGAS STOVE DOUBLE BURNER	41.00	1	82.00
6	BIOGAS LAMP WITH FIRE MAKER	14.00	2	28.00
INSURANCE				150.00
SHIPMENT FROM SHENZHEN CHINA TO				PAY BY BUYER
TOTAL IN USD				US\$6,120



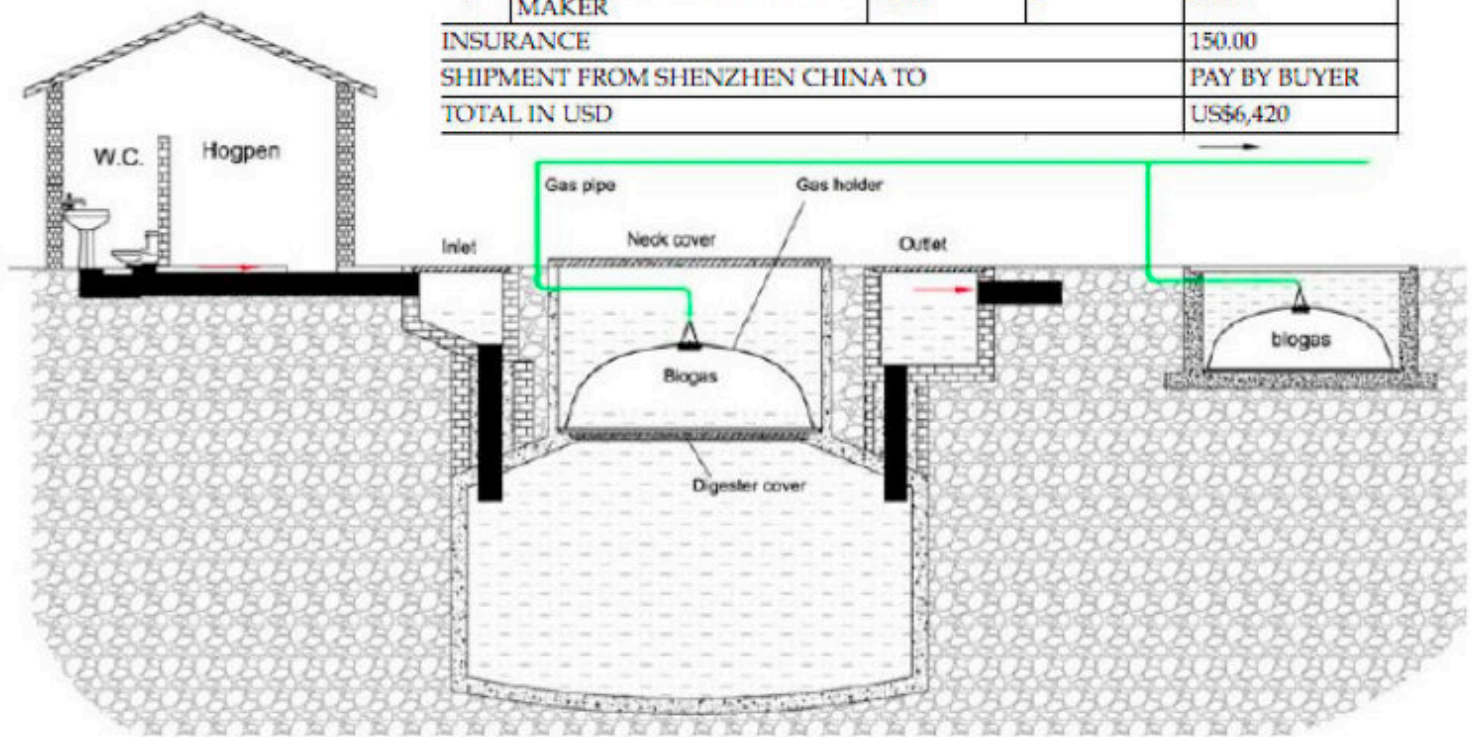
With 10 m3 family size Puxin biogas plant as per the above drawing, enough biogas can be provided to 2 families of 4 persons each for cooking and lighting. By making use of steel mould with outer 10 m3 to construct, which is can be reusable for many times.

The construction material needed to install the 10 m3 digester:

Material	Q'TY
Smashed stone	4.0 M3
Sand	3.5 M3
Cement	1400 Kgs
Brick	100 Pcs
Plastic pipe	4 Meter



FOR 1 SET OF PUXIN 10M3 FAMILY SIZE BIOGAS PLANT				
ITEM	DESCRIPTION	UNIT PRICE	Q'TY/PCS	AMOUNT(USD)
1	STEEL MOULD WITH OUTER 10M3	5390.00	1	5,390.00
2	GASHOLDER 1.0 M3	298.00	2	596.00
3	BIOGAS FITTING	38.00	1	72.00
4	BIOGAS RICE COOKER 2L	51.00	1	102.00
5	BIOGAS STOVE DOUBLE BURNER	41.00	1	82.00
6	BIOGAS LAMP WITH FIRE MAKER	14.00	2	28.00
INSURANCE				150.00
SHIPMENT FROM SHENZHEN CHINA TO				PAY BY BUYER
TOTAL IN USD				US\$6,420



Why our customers choose Puxin Biogas Plants

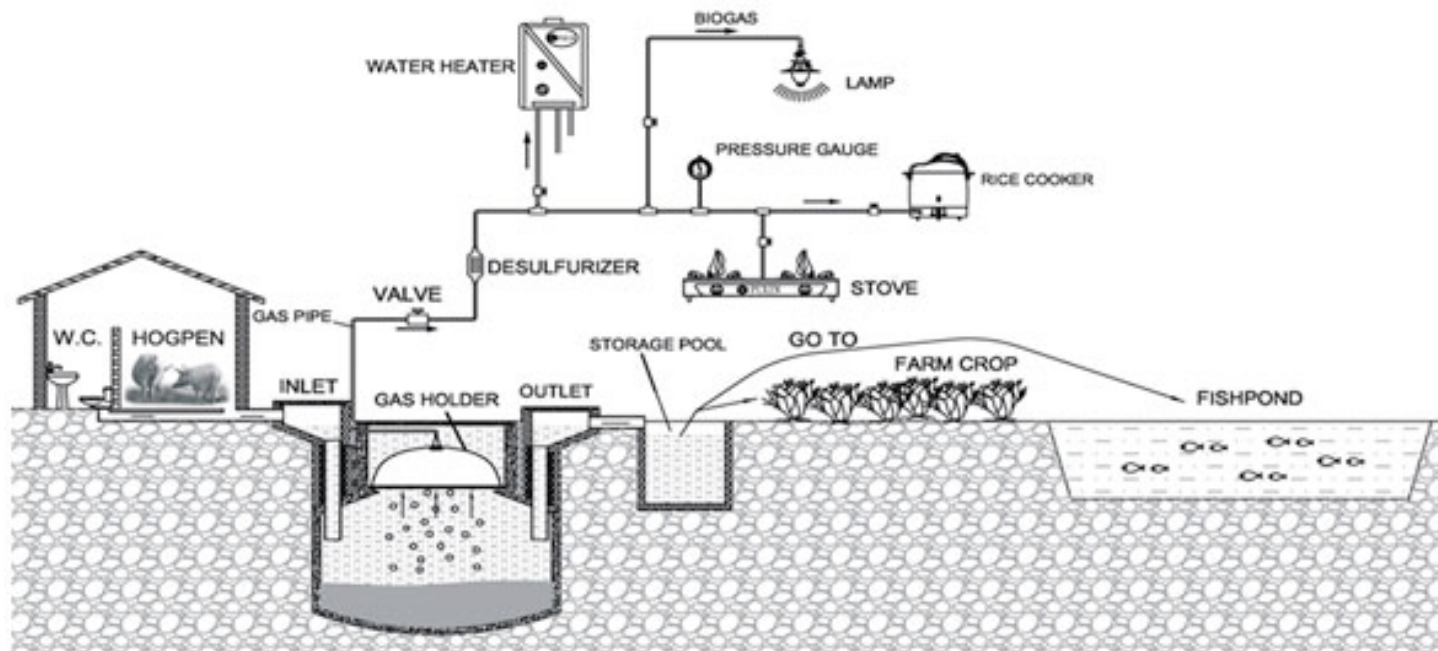
They are suitable for vast rapid construction: The steel mould and the glass fibre reinforced plastic gasholder can be mass-produced in factories, so that any place or country can build the Puxin Biogas Plant on a vast scale

Convenient to replace solid fermentation material; suitable for straw and other solid organic material: The gasholder is only 30 kg in weight, and can eliminate the atmospheric pressure. So it is effortless to take out the gasholder from the digester, and easy to replace solid material through the digester neck (1.5m in diameter).

Easy to maintain and a long service life: When the gasholder is leaking, the leak can be found immediately, and can be repaired on ground. The concrete digester can last over 30 years, and the glass fibre reinforced plastic gasholder over 10 years. When the gasholder is worn out, a new one is replaceable, so that the biogas plant can last over 30 years

Excellent airtight function and the high rate of biogas production: The glass fibre reinforced plastic gasholder sealed up by water is 100% airtight. Since replacing the fermentation material is easy, the digester can sustain sufficient fermentation material, so can the biogas plant have a high rate of biogas production.

Excellent safety and easy operation: When the gasholder is taken out, no biogas is left in the digester. The digester neck (1.5m in diameter) is large enough to keep sufficient fresh air in the digester. So it is safe both to repair the digester inside and to replace fermentation material. When the gas pressure reaches its limit, there will be automatic gas leak, hence no damage to the plant.



If you would like to know more about Puxin Biogas Plants, please do not hesitate to contact us.

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