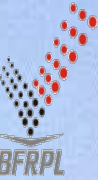


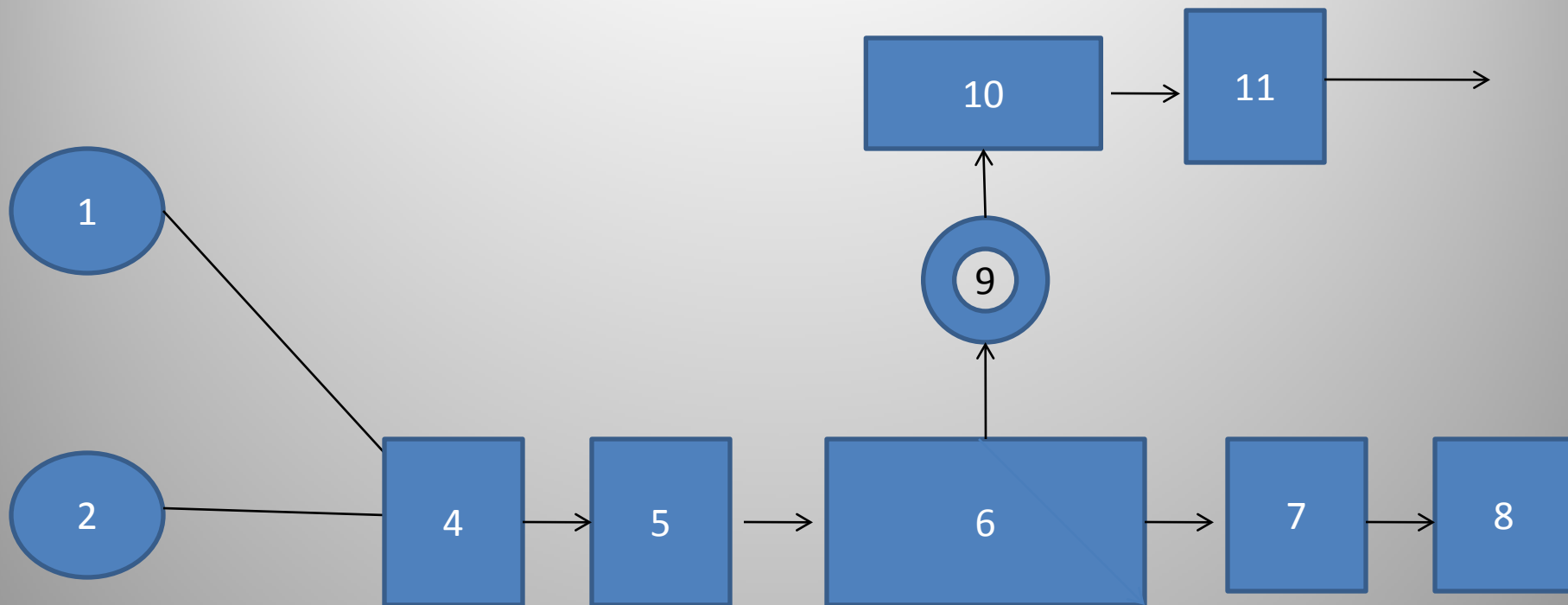
Presentation on GRP/PU- Bio Gas Digester & Tanks



BALAJI FIBER REINFORCE PVT. LTD.

THE SUM OF REINFORCEMENT

SCHEMATIC DIAGRAM OF BIO-GAS PLANT IN GENERAL



- 1- Collection of Cow Dung ,
- 2- Collection from Toilets
- 3. Collection of Agro / Kitchen Waste
- 4. Mixing Tank
- 5. Holding Tank
- 6. Digester
- 7. Sludge Holding Tank
- 8. Sludge Collection pit

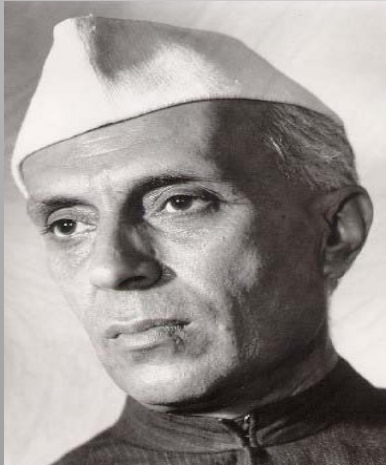
- 9. Gas Holder
- 10. Compressor
- 11. Pressure Tank

INDIVIDUAL TOILET LINKED BIO-GAS

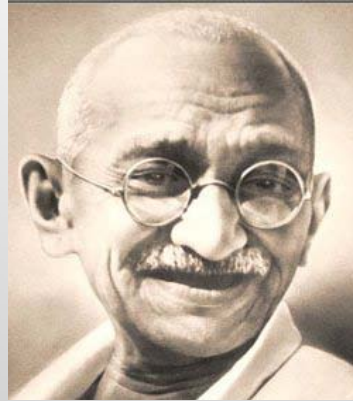
Back Ground

“Sanitation” has always been a challenging term in the human life, right from the age of civilization to the modern electronic era. Sanitation is a broader term and includes disposal of human waste, liquid waste, solid waste, control of vector diseases, domestic and personal hygiene, food sanitation etc,. Human excreta and its disposal is one of the bemoan in the modern times since it causes many enteric diseases such as cholera, dysentery, typhoid, infectious hepatitis, hookworm and diarrhea. Studies reveal that over 50 infectious diseases are transmitted through human excreta. In rural areas nearly 80% of the diseases are human excreta borne. Hence safe disposal of human waste is most important for improving the public health and economic growth.

Political Commitment to Sanitation



The day every one of us gets a toilet to use, I shall know our country has reached the pinnacle of progress



Sanitation is more important than independence



Good Sanitation should be the birthright of all citizens.

INDIVIDUAL TOILET LINKED BIO-GAS

Toilet linked Biogas Plants

In developed countries the standard solution for the sanitary disposal of human waste is water borne sewerage. Due to severe financial constraints and exorbitant cost, this is not an answer and supplement to the human waste management in India particularly in rural life. Septic tank is beyond the reach of common rural masses as its cost is high. Since drinking water is always in shortages to the requirements, it is also pertinent to conserve water in day today life. Septic tank has other problems like periodic cleaning and disposal of sludge. Due to high cost and other limitations like availability of space it has not received wider acceptance. The mechanical devices available for emptying the tanks is an over burden in terms of cost factor and alternative manual engagement of scavengers is unsocial and it is banned by the Government. The undigested human waste with water are also hazardous to public health and causes environmental pollution. Recycling and reuse of human excreta for biogas generation is an important way to get rid of these health hazards.

INDIVIDUAL TOILET LINKED BIO-GAS

Economic Viability

Biogas is a promising non-conventional energy and it is a better energy from polluting waste, clean and efficient, eco friendly, money saver, time saver, minimizes expenditure on the foreign exchanges on the import of fossil fuels apart from producing enriched bio-manure as bye product for increasing productivity and soil conservation.

INDIVIDUAL TOILET LINKED BIO-GAS

Cost Analysis

Size of Plant	Quantity of cow dung required (Kgs)	No. of cattle required	No. of persons food can be cooked
1	25	2 – 3	3 – 4
2	50	4 – 6	5 – 8
3	75	7 – 9	9 – 12
4	100	10 – 12	13 – 17
6	150	12 – 20	18 - 25

INDIVIDUAL TOILET LINKED BIO-GAS

Gas production from different feed materials

Material	Quantity of dung produced / head	Gas production / Kg.	Gas production
Cowdung	10 Kg	0.036 Cum.	0.36 Cum (Per Animal)
Night Soil	0.4 Kg	0.070 Cum.	0.28 Cum (Per person)

INDIVIDUAL TOILET LINKED BIO-GAS

Cost benefit Analysis

For a family of 5 persons per annum.

Sl. No	Particulars	Money measurement value (Rs)	Non-monetary value
1	Electricity charges (lighting)	750/-	--
2	Fuel charges (LPG)	3000/-	--
3	Value of bio-manure produced	1000/-	--
4	Man hour savings (Rs. 54 for 8 hrs) a). Cooking (3 hours / day)	7117/-	--
	b). Collection of fire wood (1/2 hour per day)	1228/-	--
5	Health incremental value	--	Infinity
6	Environmental preservation	--	Infinity
7	Family bondage	--	Infinity
8	Value of water conserved	1000/-	
9	Foreign exchange savings	900/-	--
10	Savings in construction of septic tank	7000/-	--
11	Maintenance of septic tank	400/-	--
	Total	22395/-	Infinity

INDIVIDUAL TOILET LINKED BIO-GAS

Expenditure / Maintenance Cost.

Investment cost at depreciable value year (Rs. 9500 / 20 years)	: Rs. 475/- per
Maintenance cost of plant	: Rs. 100/-
Interest on investment	: Rs. 855/-
Cost of Man hour in feeding	: Rs. 640/-
Total	: Rs. 2070/-

Net savings / annum / family : Rs. 20,325/- + Infinity value on health and environmental values.

GRP/POLYURETHANE

BIO-GAS DIGESTER

AND OTHER TANK FEATURES

GRP / PU TANKS OVER STEEL AND CONCRETE

- ✓Plastics tanks are black in colour.
- ✓Plastics absorbs the maximum amount of energy in daytime and cools down during night resulting in temperature fluctuations.
- ✓Such activity leads to contraction and relaxation exercise and ultimately the plastic creeps.
- ✓Such behavior is not supported by GRP/PU Tanks.

ADVANTAGES OF GRP / PU TANKS OVER STEEL AND CONCRETE

- ✓ Does not corrode even in adverse condition.
- ✓ Does not support bacterial growth & algae.
- ✓ Can be installed indoors or outdoors.
- ✓ Light weight and high strength to weight ratio.
- ✓ Can be fabricated in variety of shapes and colors.
- ✓ Easy to install.
- ✓ Imparts good aesthetics.

MATERIAL PROPERTY COMPARISON OF GRP / PU TANKS AND HDPE TANKS

Material Property	Unit	GRP Tanks	HDPE Tanks(Thermoplastic)
Tensile Strength	MPa	63-140	22-31
Tensile Modulus	GPa	6-12	0.6-1.0
Flexural Strength	MPa	140-250	7.0
Flexural Modulus	GPa	5-8	0.7
Density	-	1.4-1.5	0.95-0.96
Co-eff. Of Thermal Expansion	°C	8.3×10^{-6}	110-130

GENERAL PROPERTY COMPARISON OF GRP / PU TANKS V/S HDPE, RCC & MS TANKS

Property	GRP / PU TANK	HDPE TANK	RCC TANK	MS TANKS
Dimensional Stability	E	G	G	E
Weatherability	E	G	F	P
Durability	E	G	F	P
Finish & Colour	Various finish & colour	Generally Black	To be painted	To be painted
Corrosion Resistance	VG	VG	G	P
Effect on Water Quality	None	Mild	Severe	Severe
Thermal Insulation	E	G	P	P
Maintenance	Nil	Nil	Moderate	High
Creep	No	Yes	No	No

E-Excellent, G –Good, VG-Very Good, P- Poor, F-Fair

GRP / PU Tank - Features

- ✓ The BFRPL's tank is a seamless sandwich construction, with polyurethane as a core material.
- ✓ Polyurethane is a thermo set plastic foam that is by its nature inert.
- ✓ This means that Polyurethane will provide a healthy, energy efficient environment.
- ✓ As the tank is a sandwich construction with polyurethane as a core material, it makes the tank Light Weight as well as Strong & Stable.

GRP / PU Tank - Features

✓ **No Leakage-**

The tanks are molded in one piece with in- situ polyurethane injection , which results in no water leakage.

✓ **Non- Corrosive –**

The fittings provided are UPVC/CPVC. Which shall not corrode & also can be easily replaced.

✓ **THERMAL WARPAGE-**

Being a Polyurethane sandwich construction the thermal warpage is negligible than other thermoplastic material.

✓ **UV AND HEAT RESISTANCE-**

The Polyurethane core makes the tank UV protected and Heat Resistance.

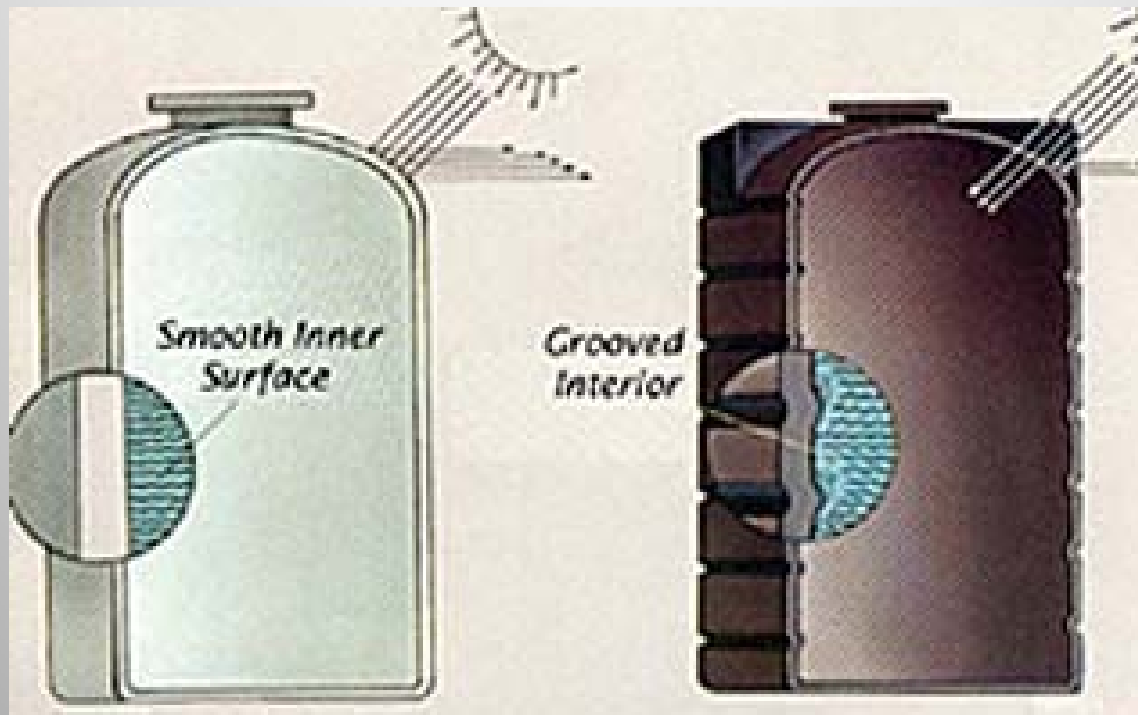
✓ **TANK CLEANING-**

The smoother surface makes it easy for cleaning the tanks.

✓ **INSTALLATION & REPAIRS-**

The tank being light in weight does not require heavy foundation laying for installation & can be repaired on-site with ease.

GRP / PU Tank - Features



GRP-PU TANK

OTHER TANKS

✓ The above picture depicts that the GRP-PU tank reflects the rays from the outer surface, whereas other thermoplastic tanks absorb the heat affecting the inner environment.

GRP/POLYURETHANE – MODULAR TOILETS

MODULAR TOILET - Features

- ✓ The BFRPL's modular Toilets are FRP/PU sandwich construction with inner layer and outer layer of Fire Retardant Resin and outer layer with Isophthalic resin.
- ✓ The toilet modules are pre-fabricated and can be installed easily at the site.
- ✓ The modular toilets are sandwich construction, with polyurethane as a core material.
- ✓ In-build provision are made for all the necessary accessories, viz, electric connection, Water, etc..
- ✓ Polyurethane will not support mold growth and is not a food source for rodents, insects or other vermin.
- ✓ This means that Polyurethane will provide a healthy, energy efficient environment.

MODULAR TOILET - Features

✓ **Non- Corrosive –**

The fittings provided are UPVC/CPVC. Which shall not corrode & also can be easily replaced.

✓ **THERMAL WARPAGE-**

Being a Polyurethane sandwich construction the thermal warpage is less than other thermoplastic material.

✓ **UV AND HEAT RESISTANCE-**

The Polyurethane core makes the toilet UV protected and Heat Resistance.

✓ **INSTALLATION IN REMOTE AREA-**

As the toilet are pre-fabricated it can installed in remote villages.

✓ **CLEANING-**

The smoother surface makes it easy for cleaning the tanks.

✓ **INSTALLATION & REPAIRS-**

The toilets being light in weight does not require heavy foundation laying for installation & can be repaired on-site with ease.

ADDRESS

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THANK YOU