

# **KELVIN WATER TECHNOLOGIES PVT. LTD.**



#### **OVERVIEW**

Kelvin Water Technologies Pvt Ltd is a team of highly determined, proactive, enthusiastic and committed professionals in the field of water, waste water and solid waste management who work with wholehearted burning desire and sincere dedication to protect our environment, public health and the mother-nature, from the hazards of growing pollution arising from water and solid wastes through best possible management services. The company also deals in a wide range of water and waste water treatment projects. We tend to cover every aspect of water, waste water and solid waste management, ranging from environmental assessment to the design and development of area specific facilities and solutions.

Since its establishment in 2006, Kelvin has developed as India's leading specialist in water and waste management sector. It is the fastest growing company in its sector and is currently operating and occupying offices and workshop facilities all over India.

We are working all over India as well as out of India to manage the pollution arising out of solid and water wastes. Also, we are actively engaged in development of new facilities to provide the highest possible efficiency in terms of public health, environmental safety and generation of renewable energy sources.



## МОТО

Nation building through Global Warming Reduction and Encouragement for Green Living is the Moto of Team Kelvin.



# **MISSION**

To be a leader in integrated waste management industry and be considered amongst the best in the world.





### 1. Waste Water Treatment Plant (WWTP)

Water polluted through the households & industrial activities are recycled again and again till it becomes usable for the same purposes or some other purposes. Waste water treatment plants are established to make the water usable by removing harmful contaminants from the dirty water. By discharging the water through the cleaning process, recycled water may be used for agriculture production. Apart from that, for cleaning the waste water, it must undergo through many process such as, Preliminary treatment, Primary treatment, Secondary treatment and Territory treatment which are all step-by-step processes.

### Basically three types of methods are used for waste water treatment (WWTP Plant):

- **1. Physical Method:** In this method, waste water is simply held in a large tank. Upper surface consists of oiling or greasing aliments which are dissolvable in water where as lower surface contains the hard solids which lays down at the lowest part. Thus, upper surface is removed through the physical efforts and middle surface which is assumed to be the re-usable water is separated for further filtration process.
- **2. Chemical methods:** When water gets filtrated through the manual process, disposed water still can't be allowed to be used because it still contains harmful dissolved solvents which is to be necessarily treated as it may lead to harmful diseases or infections to human body. So, cleaning chemicals such as chlorine or coagulation etc are used to stop the impact of the harmful pesticides or dissolved solvents.
- **3. Bio-logical method:** Waste water may consist of many organic and inorganic elements for which different process is used. Waste water consisting of organic elements can be removed through filtration or chemicals reaction. This may lead to clean the dissolved solvents from the water. Whereas to clean the inorganic waste water, using chemicals is not enough. It has to move through large number of process because harmful contaminants leave odour and make the water highly polluted. Inorganic hard solids may be reverted to carbon dioxide, water or other form of discharge.

#### TYPES OF WASTE WATER TREATMENT PLANTS

# A. STP (Sewage Treatment Plant)

Sewage Treatment Plant or simply **STP** is a highly demanded product amongst others in Kelvin company. The company is providing repairs and maintenance services in all over India at an affordable price and through the expert and efficient engineers. Sewage treatment is performed to clean the waste water underlying in land. This waste water is the result of domestic and commercial disposals, rain water etc. Thus, sewage treatment is performed to remove the majority of the contaminants lying in waste water and to produce the smooth flow of liquid which should be environment friendly. Apart from this, it helps in keeping the environment clean.

## **Technologies used in Sewage Treatment System**

### MBBR (MOVING BED BIOFILM REACTOR)

MBBR technology employs thousands of polyethylene biofilm carriers operating in mixed motion within an aerated wastewater treatment basin. Each individual biocarrier increases productivity through providing protected surface area to support the growth of heterotrophic and autotrophic bacteria within its cells. It is this high-density population of bacteria that achieves high-rate biodegradation within the system, while also offering process reliability and ease of operation. This technology provides cost-effective treatment with minimal maintenance since MBBR processes self-maintain an optimum level of productive biofilm. Additionally, the biofilm attached to the mobile biocarriers within the system automatically responds to load fluctuations.

### • MBR (MEMBRANE BIO-REACTOR)

The term 'membrane bioreactor' (MBR) is generally used to define wastewater treatment processes where a perm-selective membrane like microfiltration or ultrafiltration is integrated with a biological process – a suspended growth bioreactor. Membrane bioreactor (MBR) technology has emerged as a wastewater treatment technology of choice over the activated sludge process (ASP), which has been the conventional municipal wastewater technology over the last century. MBR is, in fact, one of the most important innovations in wastewater treatment, as it overcomes the drawbacks of the conventional ASP, including large space requirement for secondary clarifiers, liquid–solid separation issues, production of excess sludge, and limitations with removal of recalcitrant. MBRs have been used for both municipal and industrial wastewater treatment and reclamation. An MBR is a hybrid of a conventional biological treatment system and physical liquid–solid separation system using membrane filtration in one system.

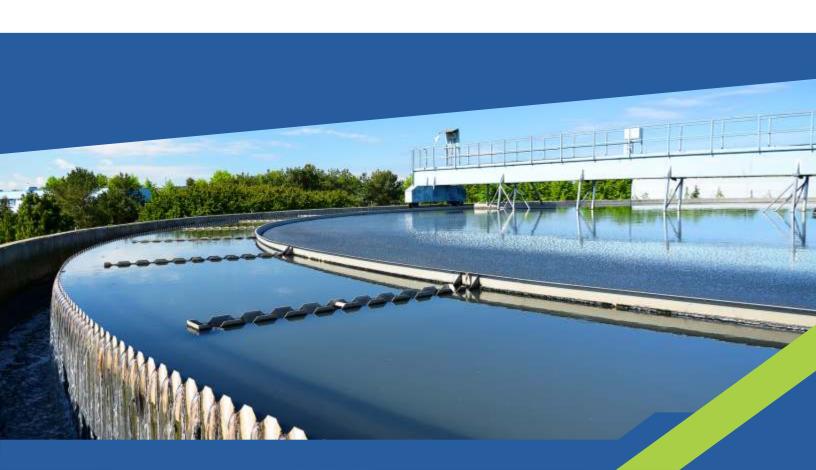


# • SBR (SEQUENCING BATCH REACTOR)

Sequencing batch reactors or SBRs use a separate pre-treatment section to mechanically hold back solids and a biological aeration and settling tank. Small SBR wastewater treatment systems clean incoming wastewater over a number of cycles. The wastewater goes first into primary treatment (1st chamber), where the solid substances are retained. From there, the wastewater is fed into the SBR tank (2nd chamber). The actual biological cleaning by microorganisms now takes place in the SBR tank. Short aeration and rest phases alternate in a controlled cleaning process. The so-called activated sludge can now develop with millions of microorganisms and clean the water thoroughly. A rest phase now follows, during which the live sludge sinks to the bottom of the system. This allows a clarified water zone to form at the top of the SBR tank. The purified wastewater is now fed into a discharge system (stream, river, lake) or into an infiltration system. Afterwards, the sludge is fed back from the SBR tank into the first.

# • SAF (SUBMERGED AERATED FILTER)

The SAF is an up-flow bioreactor which employs a high efficiency neutral buoyancy plastic media. The SAF consists of a containment vessel made in either GRP, GCS, coated mild steel, stainless steel or concrete with internal dividing walls, internal air and water distribution systems, charge of plastic media and internal support structure. The media provides a large surface area on which the bacteria attach themselves to grow and live. Wastewater is introduced into the base of the SAF unit. Air is introduced into the SAF through a separate diffuser system also located near the base of the unit. An air blower supplies oxygen to the SAF environment on a continuous basis. The air and water distribution system design is such that it creates a very effective mixing pattern within the SAF. This pattern allows for rapid distribution of the wastewater throughout the packed media bed. This produces a homogeneous solution in full contact with the entire microbial population for the period of time that the wastewater is in the reactor.



# **B. Effluent Treatment Plant (ETP)**

Nowadays effluent has gained a wider coverage as it includes almost every waste that pour into our water and air. Liquid factory waste, smoke, and raw sewage can all be called effluents. Effluent Treatment Plants are another form of waste water treatment plants which are designed and manufactured specially for treating water that contains effluents and works towards making the water effluent-free. Using an Effluent treatment plant, we convert wastewater - which is water no longer needed or suitable for its most recent use - into an effluent that can be either returned to the water cycle with minimal environmental issues or reused.

If an industry has a right to use water then it becomes their duty to make it clean or re-usable. Industries consumed clean water and in outcome they generate polluted water which includes harmful chemicals such as oils, grease, solids etc. water produced through the industrial process is called effluent. Our duty is to clean the pollutants through the effective water treatment methods. So, plants are established for this process and these plants are called "Effluent Treatment plants". As the name suggest, it involves removing the pollutants under the water to make it usable for another process and then to make the environment pollution free.

## **Working process of ETP**



# C. Combined Effluent Treatment Plants (C-ETP)

CETP's are set up in the industrial estates where there are clusters of small scale industrial units and where many polluting industries are located. Many of the Small Scale Industries (SSI) are unable to install the individual treatment systems. Hence, the concept of CETP's (Common Effluent Treatment Plants) is envisaged to benefit such industries in treating its effluent before disposal whether it is in stream, land, sewerage system or in rivers and seas. The Ministry of Environment & Samp; Forest, Government of India has launched a centrally sponsored scheme, namely, Common Effluent Treatment Plant (CETP) in order to make a co-operative movement of pollution control especially to treat the effluent, emanating from group of compatible Small-Scale Industries. The CETP therefore, reduces the treatment cost to be borne by an individual member unit while protecting the water environment to a maximum.



# D. Zero Liquid Discharge (ZLD) Projects

ZLD stands for Zero Liquid Discharge, another wastewater treatment technique is effectively used to eliminate the hard fluids and to purify the water slowly and steadily. This process is used to make the water drinkable, reusable or to recycle. Top notch municipal organization, manufacturing industries are considering ZLD as the effective waste water treatment resource. It is called ZERO LIQUID DISCHARGE as it leaves zero discharge or fluids in the water after the final process.

ZLD has enabled the company to meet the shortage of water related problems while making and recycling the water. It also meets the stringent cooling tower blow down, flue gas desulfurization (FGD) discharge regulations. Zero Liquid Discharge Facility (ZLD) is assumed to be an industrial plant to purify the waste water. If you are looking for the cost-effective solutions to clean the water fluids then ZLD or Zero Liquid Discharge will be the best option.

ZLD/RECYCLING PLANT- UF+RO1+RO2+RO3

#### 2. WATER TREATMENT PLANTS

## A. Reverse Osmosis (RO) Plant

We have been emerging as the leading manufacturer and supplier of Industrial and Commercial RO plants in India to purify the water to a great extent. Tons of water gets wasted during an industrial process and commercial keeping, which needs to be filtered to make it reusable and recyclable. RO or Reverse Osmosis is the best hyperfiltration technique which clarifies the brackish water by removing the salt, fluids, discharge, dissolvable solvents, dyes, bacteria and other harmful constituents. Our RO plants make sure that the natural nutrients are adequate to maintain the health level of water. We design customized solutions which are suitable for marine applications to purify a large amount of water at once with high-performance capacity. Not only the industrial and manufacturing units, but also municipalities can be facilitated with the customized RO plants. We are aiming to serve the whole India with the clean and reusable water. The government is taking initiative towards water treatments. Kelvin is moving together with the government to raise the water quality so as to make it approachable for the future generation.

### Features of Kelvin's RO Plant:

- ☑ Provides pure, clean and mineral water which is free from bacteria, viruses & impurities.
- ☑ Fully automatic system.
- ☑ No chemicals are being used which could be harmful for health.
- ☑ Tasty water by removing TDS or extra salt from the raw water.
- ☑ Easy, Quick and durable installation.
- ✓ Faster and timely operation and services.
- ✓ Well integrated system.
- ✓ Material of construction is PVC/SS.
- ✓ Only approved tested parts and items are used.
- ☑ Compact and modular RO blocks.
- ✓ Required pipe length to reduce system resistance.

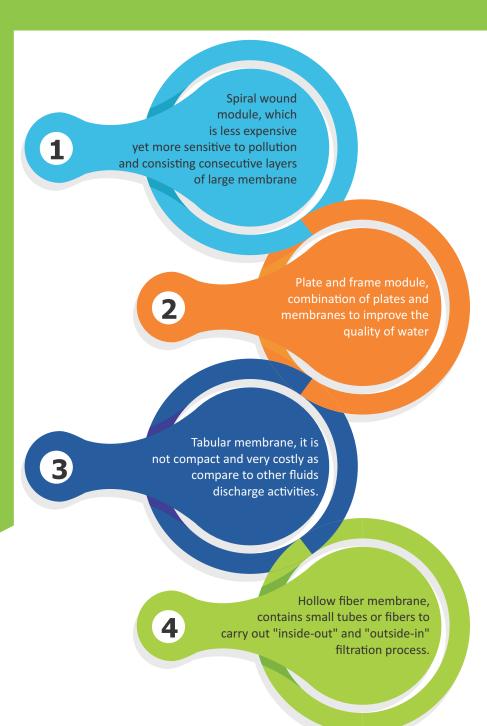


### **Applications**

- Feed Water for Boiler
- Drinking Water
- Cooking water
- Beverage Production
- For Machineries
- Food Processing
- Pharmaceuticals
- Many More

#### **B.** Ultra Filtration Plant

Out of the numerous techniques used to clean water at a huge level, ultrafiltration is widely adapted technique to separate the suspended solids from wastewater. Being the leading manufacturer and supplier of ultrafiltration plant, we offer tailormade solutions to detect or eliminate the solids, colloids, micro-organisms from the surface or ground water to keep the water bacteria-free.



#### Ultrafiltration in divided into two operational techniques:

- ☑ **Dead-End:** In this process, whole water is pressed through membrane modules.
- ☑ **Crossflow:** Water flows parallel to the membrane face; one part is passed through membrane and another part is recirculated to create turbulences over the membrane.





## C. Demineralisation (DM) Plant

Demineralization is also called deionization and is used to remove the salts and minerals available in water to make it drinkable and soft. Demineralization is performed with help of ION Exchange, RO, Distillation and Electro Dialysis processes. RO and Electro Dialysis are performed to remove the dissolved solids with the help of membrane process where as Ion exchange is softening process which is mostly used to remove the hard minerals such as calcium, magnesium from the water or waste water. In this process, Hydrogen (H+) and Hydroxide (OH-) are used to replace the negative and positive ions. Negatively charged ions are called anions and positively charged ions are called cations. Cations include the calcium, magnesium, sodium which is treated with acid and replenishes with H+ ions. Whereas Anions denotes chloride, sulphate, nitrate, bicarbonate etc and replenished through OH- ions. It is assumed that the treated water is already filtered but is hard enough to drink

#### **Applications:**

- Food & amp; Beverages
- Electroplating etc
- Pharmaceuticals
- Batteries
- Swimming pools
- Kitchen
- Cosmetics
- Hospitals
- Hotels
- Automobiles
- High pressure boiler feed water
- Laboratories



### D. Water Softener Plant

Water softening is a process of removing metals and minerals such as calcium, magnesium, and certain others found in hard water. The soft water needs lesser soap for the same clean up effort, as soap is not wasted in sweeping off the calcium ions. Soft water also helps in enhancing the life of plumbing by eliminating the scale build-up in pipes and fittings. Water Softening Plant usually operates through ion-exchange resins or through the use of lime.

Softening of water is processed through the ion exchange and precipitation methods. This process relies on removing mainly two minerals i.e. calcium and magnesium with the flow of sodium. In this process, two separate tanks are associated with a pipe. These two separate tanks denote the brine tank and mineral tank. Mineral tanks consist of raw water containing minerals where as brine consists of the sodium chloride and both tanks are connected with a tube or pipe. As the process starts, surface of vessels contains the calcium and magnesium which is flushed through the flow of sodium (salt) which is perfect and powerful solution for the minerals.

# **Principles of Ion Exchange to Soften Water**

Calcium and magnesium ions are atoms having a positive electrical charge, as do sodium and potassium ions. Ions of the same charge can be exchanged. In the ion exchange process, a granular substance (usually a resin) that is coated with sodium or potassium ions comes into contact with the water containing calcium and magnesium ions. Two positively charged sodium or potassium ions are exchanged for every calcium or magnesium ion that is held by the resin. This exchange or swap happens because sodium or potassium are loosely held by the resin. In this way, calcium and magnesium ions responsible for hardness are removed from the water, held by the resin, and replaced by sodium or potassium ions in the water. This process makes water "soft." Eventually, a point is reached when very few sodium or potassium ions remain on the resin, thus no more calcium or magnesium ions can be removed from the incoming water. The resin at this point is said to be exhausted and must be recharged.



#### 3. SOLID WASTE AND MANAGEMENT

Not everybody knows that the trash lying in our dustbin is a potential source of energy. Biodegradable wastes can be decomposed and can be made reusable.

Solid waste management is one of the most neglected areas of municipal services and infrastructure. Most of the developing cities face the immense challenge of managing high volumes of solid waste. Problems often include poor waste collection and processing, insufficient landfill infrastructure, lack of technical skills and regulation etc. When solid waste management is lacking there are significant consequences for human health and environmental sustainability.

Hence, Solid Waste Management or simply Waste Management is all about how solid waste can be processed and used as a valuable resource. Solid waste management should be embraced by every household at individual level including all sectors of the economy to control the production, disposal, collection, processing, transferring of the solid waste items in the best possible manner with due focus on people's health and the environmental considerations.

# Types / Categories of wastes

Waste can be material based, such as plastic, paper, glass, metal, and organic waste. It may be based on hazardous nature, including radioactive, flammable, infectious, toxic. Categories may also be based on the origin of waste, such as industrial, domestic, commercial, institutional or construction and demolition.

# Following are some waste types based on their origin: Source Type of solid waste

**Food Wastes** 

Textiles

Kitchen Wastes Glass

Paper

Metals

Residential

Wood

Yard Wastes

**Batteries** 

Garden Wastes •

Oil, Etc.

Industrial (construction Sites, Power And Chemical Plants. Manufacturing, Fabrication)

Housekeeping Waste

**Packaging** 

**Food Wastes** 

Construction & Demolitions

Hazardous Wastes, Etc

Commercial

(Stores, Hotels, Office Buildings)

Paper

**Food Wastes** 

**Plyboards** 

Metals

Plastics

Glass

**Boxes** 

Etc.

Institutional (School, Hospitals, Prisons, **Government Centres)** 

**Paper** 

**Food Wastes** 

Plyboards,

Metals

**Plastics** 

Glass

**Boxes** 

etc.

Municipal Services (Streets, Parks, Beaches, Other Recreational Areas, Water Sources)

Street Sweeping

Landscape & Tree Trimming

General Wastes From Park And Beaches

Sludge In Water Source

Agricultural (Crops, Orchards, Vineyard, Dairies, Farm)

- Spoilt Food Waste
- Agricultural Waste
- Hazardous Wastes as Pesticides
- etc.



### WHY SOLID WASTE MANAGEMENT?

The most important reason for waste management is the protection of the environment and the health of the population. Mismanagement and the meaning of the population is the protection of the environment of the properties of the properties of the protection of the environment of the properties of the protection of the protection of the environment of the protection of the protection of the environment of the protection of the environment of the protection of the environment of the protection of the protection of the environment of the environment of the protection of the environment of the environment of the protection of the environment of the environmenunsystematic dumping of solid waste hampers the personal, environmental and the economical health of a nation. Unsanitary practices lead to pollution of the environment which results in the outbreak of serious vulnerable health hazards. Rotten garbage and waste produce foul smell that can cause nausea among people. It can also be a source for waterborne diseases such as cholera, diarrhoea and abdominal discomfort. It can also produce harmful gases that mix with the air and can cause breathing problems in people. Landscapes can be deteriorated through haphazard dumping and littering which destroys the beauty and serenity of tourist places. Natural beauty is a legacy and our future generation has a full right on it. Hence, it is our responsibility today to take measures for conserving it, so that the upcoming generation enjoys the aesthetic appeal of our planet.

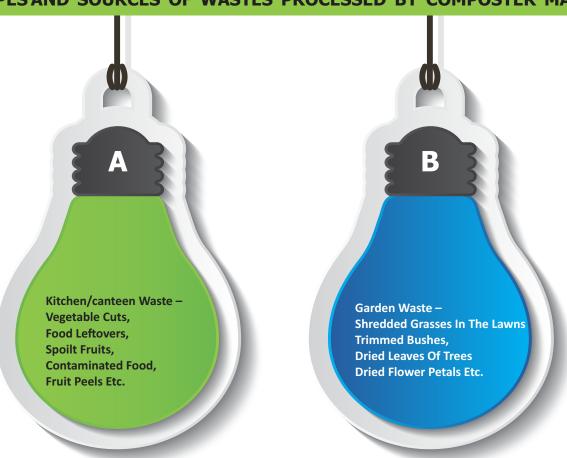
### **OUR SOLID WASTE PRODUCTS AND SERVICES**

# 1. Organic waste - COMPOSTER/MACHINE

Bio-degradable wastes are converted into bio energy in our Organic Waste- composter. We have fully automatic, semi-automatic as well as manual machines as per the needs and requirement of customers. The composter machine is a digestive system that functions with its special technique to decompose all sort of organic wastes within a short span of time. The machine has an inbuilt waste shredder which cuts the bio-degradable wastes into tiny pieces and then transfers them to a collection tank where actual composting takes place. After composting, the raw compost needs to be dried up for removing the moisture out of them.

With the right conditions (air and moisture), organic waste such as food and plant materials like grass and leaves can be decomposed by organisms like bacteria, fungi and worms. In this equipment, only biodegradable wastes are used for composting and this process turns the organic waste into nutrient rich compost and fertilizers that can be used in agriculture.

# TYPES AND SOURCES OF WASTES PROCESSED BY COMPOSTER MACHINE





# WHAT TO COMPOST AND WHAT NOT?

### **COMPOST**



COMPOST all food wastes (including dairy, meat and poultry)

Decomposable wastes from the mess

Napkins, paper towels, yard trimmings, tea bags

Wooden stirrers

#### DO NOT COMPOST

Sachets and single serve packets

Recyclable items like metal, plastic and paper

Coffee cups and lids (disposables)

Soup lids from the mess

### $\dashv$ TYPES OF COMPOSTERS $\vdash$

#### A. FULLY AUTOMATIC COMPOSTER

- The machine is capable of processing up to 1000 kg of wastes and converting it into 150-200 kg of humus.
- PLC with digital reading system.
- Time duration for composting shall be 24 to 48 hours.
- Accompanied with Exhaust fan and blower
- Minimum power consumption.
- It is environment friendly process.
- The machine is noiseless as well as odourless.
- The machine has a long life and compact size.
- The organic waste is turned into nutrient rich compost and fertilizers that can be used in agriculture, farming and gardening.
- Composting is a fully natural and biological process which must be adopted for controlling pollution and for improving our soil's fertility.
- Dehydration system is an additional feature which requires additional cost to be installed. Once installed, it can enhance the composter's output by more or less 10 times. It further aids in reduction of operation and maintenance cost of the machine to a remarkable extent.

#### **TECHNICAL SPECIFICATIONS**

- A. Weight Ranging from 100 kg to 1000 kg (as per requirement)
- B. Volume reduction 85-90%
- C. Dimension Depends on the quantity of waste creation per day
- D. Power consumption 1.5 to 5 HP (Single / Three phase)
- E. Control system PLC based
- F. Machine operation Fully automatic





### **B. SEMI- AUTOMATIC COMPOSTER**

- Can generate 15 to 20 kg of organic compost by processing up to 100 kg of waste in a day.
- Time duration for composting shall be 24 to 48 hours.
- Minimum power consumption.
- Easy operation and maintenance.
- It is environment friendly process.
- The machine is noiseless as well as odourless.
- The machine has a long life and compact size.
- The organic waste is turned into nutrient rich compost and fertilizers that can be used in agriculture, farming and gardening.
- Composting is a fully natural and biological process which must be adopted for controlling pollution and for improving our soil's fertility.
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- D. Power consumption 1.5 to 5 HP (Single/Three phase)
- E. Machine operation Semi automatic



# Parts of Machine (Both Fully and Semi Automatic)

- → Shredder
- → Humidity sensor,
- → Inbuilt heating system,
- → Mixing blades,
- → Composting tank,
- → Moisture control and air ventilation system,
- → Dehydrator (on customer demand) etc.



## NOTE:

There is no Significant Differences Between a Fully Automatic and Semi Automatic Composters. Semi-Automatic Machine Requires Minimal Human Interference Which is Absent in Fully-Automatic Machine.

#### 4. BIO-GAS PLANT

Worldwide interest and people's cautiousness in renewable energy sources is gathering momentum. It is not just the organic humus that can be generated out of organic waste, bio-gas is another highly demanded outcome of composted organic waste. Bio-gas is defined as a mixture of different gases which is produced by the breakdown of organic matters. Bio-gas can be produced out of organic wastes, municipal waste, sewage, animal wastes etc. Bio-methane is one of the popular example of bio-gas which is being used by various households throughout the world for thermal and electrical applications.

#### **KELVIN BIO-GAS PLANT**

Kelvin Bio-gas generator is a purely natural system that generates clean energy out of the domestic wastes around us. The system does not use electricity for its operation and is capable of producing cooking gas for everyday use solely from the food scraps and animal waste.

# Features and technical specifications:-

- ☑ Eco and environment friendly.
- ✓ Noiseless
- ✓ Process is fully natural.
- ☑ Plant requires less maintenance.
- ☑ No requirement of external energy or chemicals.
- ☑ Bio-gas generated can be used for cooking or burning lamps or for generation of electricity.

#### How does it work?

- ☑ First, the waste is fed into the system sink.
- ☑ The bacteria in the tank digests or ferments the organic waste and turns it into bio-gas.
- ☑ Bio-gas is aggregated in the tank and stored at low pressure.
- ☑ Gas flows from the tank to the kitchen through connected pipe which can be used for cooking.
- A by-product, Liquid Fertilizer is also produced in the digestion process which can be used in farming and gardening.



# **5. Swimming Pool Filtration Plant**

Pool plants are effectively designed and manufactured according to the needs of the clients. We are providing the latest technology pool pumps to filter the same and to make the swimming water pollution and germ free. Clean and pure water which is disease- free makes the swimming experience enjoyable. Swimming pool filters provided by Kelvin are of high quality and within the set standards and compliance, sizes of which differ according to customers requirements.

Basically, to make the swimming pool water clean and pure, pH level of water should be adjusted in a proper way and chlorination is performed to make the water salt free. Residential filters are of small size but the filters used in industrial areas are bigger and of high quality, so as to serve and cater to maximum number of users.

# 6. Rain Water Harvesting Plant

The 'Rain water Harvesting' system is used to restore the rain water for future use with effective management and conservation. The stored rainwater can be used for human, animal and agricultural needs through the water collection method. Water is collected and pumped through separate pipe distribution. Developing countries like India is using such method to reduce the cost of operation, maintenance and distribution of other heavy and sophisticated treatment plants. At Kelvin we follow the procedures that are cost effective and there is no compromise in the quality.





# **OUR VALUABLE CLIENTS**































































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