WATER AND WASTEWATER TREATMENT

2014 CATALOGUE

HELP & ADVISE

PACKAGED STP

PRE FABRICATED STP

CUSTOM DESIGNED STP

SEWAGE RECYCLING PLANT

ACCESSORIES

INDUS ECOWATER

Innovative & Affordable Sewage Solutions

www.modernstp.com

What is sewage Treatment Plant ?

Sewage is the wastewater generated from various utilities in our homes and includes kitchen, laundry and bathroom sink, as well as what you flush down the toilet.
It is essentially 99.7% water containing solids like food particles, oils, dirt and chemicals like detergents 0.03%. Dirty water from businesses and factories is also discharged into the Sewage Treatment Plant system. This is known as trade waste.
Most of the sewage from our homes and businesses flows via large underground sewer pipes to Sewage Treatment Plants where it is treated to make it safe for release back into the environment.

Why Sewage Treatment Plant ?

Sewage carries pathogenic organisms that can transmit diseases to humans and other animals; contain organic matter that can cause odor and nuisance problems;
hold nutrients that may cause eutrophication of receiving water bodies; and can lead to eco-toxicity. Proper collection and safe, nuisance-free disposal of the liquid wastes of a community are legally recognized as a necessity in an urbanized, industrialized society.
The reality is, however, that around 90% of wastewater produced globally remains untreated, causing widespread water pollution, especially in low-income countries.

Increasingly, agriculture is using untreated wastewater for irrigation. Cities provide lucrative markets for fresh farm produce. Agriculture has to compete for increasingly scarce water resources with industry and municipal users. Often there is no alternative for farmers but to use water polluted with urban waste, including sewage, directly to water their crops. There can be significant health hazards related to using water loaded with pathogens in this way, especially if people eat raw vegetables that have been irrigated and grown with polluted water / sewage.

Request a best quote cost of sewage treatment plant in India. We offers best sewage treatment systems at low cost

Sewage Generation Data

Per person / activity / day (unless otherwise specified)	FLOW (Litres)	BOD (Grams)	Ammonia as N (Grams)
DOMESTIC DWELLINGS			
Standard residential	150	45	6
INDUSTRIES			
Office / Factory without canteen	50	25	5
Office / Factory with canteen	100	38	5
SCHOOLS			
Non-residential with canteen cooking on site	90	38	5
Non-residential without a canteen	50	25	5
Boarding school			
(i) residents	200	75	10
(ii) day staff (inc. mid-day meal)	90	38	5
HOTELS, PUBS & CLUBS			
Hotel Guests (Prestige hotels)	300	105	12
Hotel Guests (3* & 4* hotels)	250	94	10
Guests (Bedroom only – no meals)	80	50	6
Residential Training/Conference Guest	350	150	15
Non residential Conference Guest	60	25	2.5
Holiday camp chalet resident	227	94	10
Resident Staff	180	75	10
Restaurants - Full Meals - luxury catering	30	38	4
- pre - prepared catering	25	30	2.5
- Snack Bars & bar meals	15	19	2.5
- Function Rooms including buffets	15	19	2.5
- Fast Food i.e. (roadside restaurants)	12	12	2.5
- Fast Food Meal (burger chain and similar)	12	15	4
AMENITY SITES			
Toilet Blocks (per use)	10	12	2.5
Toilet (WC) (per use)	10	12	2.5
Toilet (Urinal) (per use)	5	12	2.5
Toilet Blocks in long stay car parks/lorry parks (per use)	10	19	4
Shower (per use)	40	19	2
Golf Club	20	19	5
Local community sports club, e.g. rugby & football	40	25	6
Swimming (separate pool exists without sports centre)	10	12	2.5
Health Club/Sports Centre	50	19	4
Tent sites	75	44	8
Caravan Sites -			
(i) Touring not serviced	100	44	8
(ii) Static not serviced	100	44	8
(iii) Static fully serviced	180	75	8
HOSPITALS & RESIDENTIAL CARE HOMES			
Residential old people / nursing	350	110	13
Hospitals per bed	450	140	Assess

Explanation for Domestic housing sewage generation

A treatment system for a single house with up to and including 3 bedrooms shall be designed for a minimum population (P) of 5 people.

The size of a treatment system for a single house with more than 3 bedrooms shall be designed by adding 1 P for each additional bedroom to the minimum single house value of 5 P, eg:

House with 3 bedrooms = minimum 5 P systemhouse with 4 bedrooms = minimum 6 P system (5+1)
House with 6 bedrooms = minimum 8 P system (5+3)

For groups of small 1 and 2 bedroom houses or flats

Flat with 1 bedroom = allow 3 P
Flat with 2 bedrooms = allow 4 P
Flat with 3 bedrooms = allow 5 P

A treatment system serving a group of houses shall be designed by adding together the P values for each house calculated independently,

eg:For a group of two houses (3 and 4 bedrooms, respectively)
the system shall be for a minimum of 11 P (5+6)

If the calculated total P for a group of houses exceeds 12 P then some reduction may be made to allow for the balancing effects on daily flow of a group of houses (round UP not down)

Where the total is 13-25 P multiply the total by 0.9 to give an adjusted P value,
e.g. if there are four four-bedroom houses the total P will be 24 P (4 x 6) and
the adjusted P will be 22 P (24 x 0.9 = 21.6)

Where the total is 26-50 P multiply the total by 0.8 to give an adjusted P value,
e.g. if there are four three-bedroom houses and three four-bedroom houses
the total P will be 38 P (4 x 5 and 3 x 6) and the adjusted P will be 31 P (38 x 0.8 = 30.4)

Mains & Off-Mains Drainage

Houses are linked to a public sewer pipeline - You flush the toilet, water goes into municipal sewers / drains and have very little to worry about. This is Mains Drainage. In suburban and rural areas many homes are self-contained; there are no municipal underground drains to carry Sewage Treatment Plant (STP). This has no connection to the public sewer system and is known as Off-Mains. Users have to make their own arrangement to dispose Sewage using a Sewage Treatment Plant (STP).

On-site: Critical Factors to Consider

As the flow chart below shows, site assessment is a vital stage in the system selection process.
A septic tank installation in unfavorable conditions is likely to result in failure and expense.
To minimize assessment costs, particularly for sites which prove unsuitable, Indus recommends a 3 step procedure.

Step 1: Consultation & Visual Inspection

Make an initial visual assessment of the land's suitability for septic tank drainage:

- Consult the Environmental Regulator
- The drainage field should be sited on land sloping away from the property.
- There should be adequate access for de-sludging vehicles.
- Any stream, well, borehole or spring on-site can affect the positioning of the unit.
- The site area and proximity of the site boundaries will help determine whether an adequate
- Sewage Treatment Plant (STP) with drainage field can be installed.
- Water loving plant species could indicate poor drainage.

Step 2: The Trial Hole

(Proceed with step 2 only if step 1 results are favorable)

Well drained soil is usually brown, reddish or yellow. Grey or blue subsoil often means heavy clay or poor drainage.
The position of the water table must not rise to within 1 mtr of the Sewage distribution trench.
There should be at least 0.5 metre of suitable subsoil available below the base of the distribution trench.

Step 3 - Percolation Testing

(Proceed with step 3 only if step 2 results are favorable)
Now that results of Steps 1 & 2 are favorable, it is essential that you carry out a percolation test in accordance with BS 6297 and building regulations. The percolation test will indicate soil porosity values. Excessively rapid percolation can threaten groundwater resources, whilst very slow percolation can result in surface water logging. Percolation test results will help you decide on the area of land needed to provide a sustainable drainage field.

Conclusions In the chart below, the left hand soil profile shows:

- A low water table
- Suitable subsoil
- Advantageous topography
- Good access
- Adequate land area

These indicators, when combined with satisfactory percolation, would all suggest that a septic tank system may be sustainable. On the right side of the chart a high water table, shallow subsoil and heavy clay suggest that percolation testing results will be unsatisfactory and an alternative disposal system should be installed. ***Indus will provide further advice.***

Can You Connect to Municaipal Sewers ?

Yes → **Take Municipal Permission & Connect to Public Sewers**

No ↓

Do You have large area of suitable land to discharge ?

Yes → **Install a properly designed packaged sewage treatment plant / septic tank**

No ↓

Do you have water body nearby to discharge ?

Yes → **Install a property designed packaged sewage treatment plant and discharge treated water after permission from relevant department**

No ↓

Can You Possibly afford a zero discharge / chemical system ?

Yes → **Install a chemical toilet / cess Pool to get zero discharge with permission from relevant department**

No ↓

No Sewage System is appropriate so DO NOT BUILD here

Types Of Waste Water Treatment Plant - Aerobic & Anaerobic

Help & Advise

Aerobic, as the title suggests, means in the presence of air (oxygen); while anaerobic means in the absence of air (oxygen). These two terms are directly related to the type of bacteria or microorganisms that are involved in the degradation of organic impurities in a given wastewater and the operating conditions of the bioreactor. Therefore, aerobic Waste Water Treatment Plant processes take place in the presence of air and utilize those microorganisms (also called aerobes), which use molecular / free oxygen to assimilate organic impurities i.e. convert them in to carbon dioxide, water and biomass.

The anaerobic treatment processes, on other hand take place in the absence of air (and thus molecular / free oxygen) by those microorganisms (also called anaerobes) which do not require air (molecular / free oxygen) to assimilate organic impurities. The final products of organic assimilation in anaerobic Waste Water Treatment Plant are methane and carbon dioxide gas and biomass.

From the summary in Table, it can be concluded that anaerobic and aerobic Waste Water Treatment Process will give best result for water containing higher inpurities.

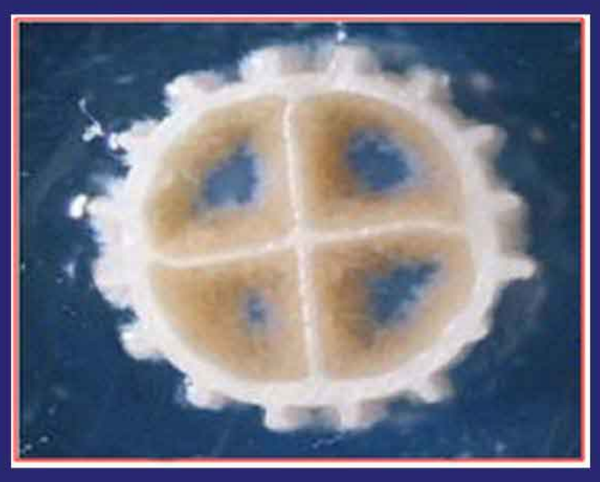
Indus offers waste water treatment plants combining aerobic and anaerobic process.

Parameter	Aerobic Treatment	Anaerobic Treatment
Process Principle	Microbial reactions take place in the absence of molecular / free oxygen Reaction products are carbon dioxide, methane and excess biomass	Microbial reactions take place in the absence of molecular / free oxygen Reaction products are carbon dioxide, methane and excess biomass
Applications	Wastewater with medium to high organic impurities (COD > 1000 ppm) and easily biodegradable wastewater e.g.food and beverage wastewater rich in starch /sugar / alcohol	Wastewater with low to medium organic impurities (COD < 1000 ppm) and for wastewater that are difficult to biodegrade e.g. municipal sewage, refinery wastewater etc.
Reaction Kinetic	Relatively Fast	Relatively Slow
Post Treatment	Typically direct discharge or with filtration / disinfection	Invariably followed by aerobic Treatment
Foot Print	Relatively Large	Relatively Small and compact
Smell	No Smell	Generates foul odour
Capital Investment	Relatively High	Relatively low with payback
Technology examples	Activated Sludge i.e, Extended aeration, MBR, MBBR, SAF, FAB, RBC	UASBR etc

ADVANTAGES OF MBBR

The MBBR Design is an innovative biological treatment process using thousands of special carriers designed to create an enormous total surface area for biofilm growth – enhancing your wastewater treatment process without expanding your footprint. Foot print for MBBR systems is just about 25% of conventional activated sludge process.

The MBBR Design process is based on a bio-film that provides for organic carbon removal, as well as nitrification and de-nitrification where needed, without circulation of activated sludge. The process is simple, robust, and requires minimal operator intervention. Wastewater is introduced into a single or multiple-stage system (depending on whether Nitrogen removal is required), each of which contains the suitable volume of biomass carriers.



- ★ **Compact** : **MBBR plants save 30% + space**
- ★ **Saves on power** : **saves energy cost due to higher oxygen transfer**
- ★ **Easy Start up** : **do not need higly skilled oparators**
- ★ **No sludge recirculation** : **doesnt need sludge recirculation**
- ★ **Fluctuations** : **plants can handle flow varitions**

CHECKLIST FOR SEWAGE TREATMENT PLANT (STP)

Are you planning for a sewage treatment plant? Consider the following issues carefully to get best out of your STP. Sewage comprises of liquid and solids. The treatment plan must include proper treatment for both liquid and solids. Proper disposal mechanism for treated solids and liquid is just as essential. Most vendors skimp on cost and do not plan for solids treatment and disposal.
This includes big established organizations

Treatment Plant Capacity

No.	Description	Yes	No	Remarks
1	Is the sewage generation calculated at 150 lts per head per day ?	☐	☐	150 Lts per capita will be Considered by PCB for arriving at plant capacity.
2	Is the planned STP capacity matching the generation ?	☐	☐	Ensure that STP capacity is plus or minus 10% of above capacity.
3	Can the plant handle from 30% to 100% capacity ?	☐	☐	Opt for plant designs that can works well even at 30% capacity as initial loads will be just that much

Technology

No.	Description	Yes	No	Remarks
1	Are you opting for attached growth process ?	☐	☐	MBBR, FAB, SAFF, RBC etc are all attached growth processes each with advantages & disadvantages
2	Is any media being planned in bio reactor ?	☐	☐	All attached growth plants will have media
3	Is the volume of the media as per design requirement ?	☐	☐	Check for correct media volume. Lower volume will not give desired output water quality
4	Does the media float in water	☐	☐	Fixed media are outdated and has more disadvantages- avoid them at all costs

Collection Tank

No.	Description	Yes	No	Remarks
1	**Is the collection tank volume sufficient ?**	☐	☐	**Collection tank volume should a minimum 33% of STP capacity (in KLD)**
2	**Is aeration grid planned for collection tank**	☐	☐	**If aeration is not provided, it will give foul odour**
3	**Does the collection tank have access manholes ?**	☐	☐	
4	**Are rungs (steps) provided to get into the tank ?**	☐	☐	**Required for maintenance in future**
5	**Are the rungs where provided are made of non-corrosive materials ?**	☐	☐	**Required for de-watering completely**
6	**Does the collection tank have a pump sump ?**	☐	☐	
7	**Have you considered periodic cleaning of collection tank ?**	☐	☐	**Tank must be cleaned once every 2 years**

Aeration Tank / Bio-reactor

No.	Description	Yes	No	Remarks
1	Is the aeration tank volume sufficient ?	☐	☐	Depending on process, 25% to 50% of STP capacity is required for aeration tank
2	Is aeration grid planned to diffuse required quantity of air into the bio-reactor ?	☐	☐	
3	Does the aeration tank have access manholes ?	☐	☐	
4	Are rungs (steps) provided to get into the tank ?	☐	☐	
5	Are the rungs where provided are made of non-corrosive materials?	☐	☐	
6	Is there any possibility of solids settling in aeration tank ?	☐	☐	Settling of solids will give foul smell in tank
7	Have you considered periodic cleaning of aeration tank ?	☐	☐	
8	Is an outlet launder provided in the aeration tank ?	☐	☐	If not, solids will carry into the settling tank
9	Is there any arrangement to prevent media going into settling tank ?	☐	☐	Media must remain in aeration tank & shouldn't get into settling tank

Settling Tank

No.	Description	Yes	No	Remarks
1	Is the settling tank designed as tube settler ?	☐	☐	Tube settler is more efficient- but design is critical for success & needs more maintenance
2	Is chemical dosing pump provided ?	☐	☐	Poly / alum dosing must be provided
3	Does the settling tank have hopper shaped bottom ?	☐	☐	
4	Is the water column depth below 2.5 Mts in ST ?	☐	☐	If the depth is more, water may become septic
5	Is a dedicated sludge transfer pump provided ?	☐	☐	2 Sludge transfer pump(s) are a must

Sludge Holding Tank (SHT)

No.	Description	Yes	No	Remarks
1	Is a dedicated sludge holding tank provided ?	☐	☐	SHT is required for all STPs in closed areas. Not needed if sludge dry beds are provided.
2	Is the sludge holding tank volume at least 15% of STP capacity ?	☐	☐	This is critical to ensure proper sludge digestion. Un-digested sludge generates foul odour.
3	Is the sludge holding tank provided with diffused aeration grid ?	☐	☐	Required for sludge digestion. DO NOT plan for anaerobic digestion as generates foul smell
4	Is 30% blower air pumped into holding tank ?	☐	☐	Ensure that blower is of required capacity
5	Is a sludge transfer pump provided ?	☐	☐	
6	Have you considered periodic cleaning of sludge tank ?	☐	☐	Must design every tank for periodic cleaning

Sludge de-watering

No.	Description	Yes	No	Remarks
1	Are you aware that water has to be removed from sludge before disposal ?	☐	☐	Water has to be removed from sludge so that only solids can be disposed off
2	Are you aware that there is NO method of disposing sludge as it is ?	☐	☐	DO NOT plan for tankers as they are not permitted
3	Do you know that only digested sludge will de-water easily ?	☐	☐	Un-digested sludge is very sticky and a nuisance to handle with filter press
4	Do you have space for sludge drying beds ?	☐	☐	This is the easiest & most economical option if you have open spaces
5	Do you wish to spend for filter press or centrifuge ?	☐	☐	Filter press is expensive & energy intensive
6	Do you know that semi solid sludge cake has to be removed manually even in a hydraulic filter press ?	☐	☐	Sludge has to be scrapped off from the filter cloth manually
7	Have you seen a filter press in operation ?	☐	☐	Check out on You Tube for better idea of how it works. It's operation is messy – choose other options as we may not get operators to work on them in future

Treated Water Tank

No.	Description	Yes	No	Remarks
1	Are you planning to re-use treated water ?	☐	☐	If there is no re-use of treated water, there is no need for treated water tank.
2	Do you want to re-use water for toilet flushing ?	☐	☐	Take maximum care to provide best quality treated water as water stored in flush tanks has foul smell and residents will complain
3	Did you plan for additional treatment of treated sewage before using in toilet flushing ?	☐	☐	Advanced filtration methods like UF will improve water quality to re-use level. Always plan for this if you are planning for toilet flush / car wash etc
4	Is a separate UF treated water tank planned ?	☐	☐	This is a must when you wish to re-use treated water for toilet flushing etc
5	Is aeration provided in treated water tank ?	☐	☐	Even a small volume aeration will help avoid foul smell in toilets and resultant complaints

Electrical Panel / Automation

No.	Description	Yes	No	Remarks
1	Is the STP panel manual ?	☐	☐	Manual panels are designed for 24 X 7 operation only
2	Does it need manpower 3 shifts a day ?	☐	☐	All manual panels need operators in three shifts
3	Is the panel designed to protect pumps / motors against voltage fluctuations ?	☐	☐	Ensure that panel has provision for single phase prevention & overload
4	Is the panel designed to reduce power consumption ?	☐	☐	Automatic panels are programmable & power consumption will be directly proportionate to the sewage volume
5	Can automatic panel work for lesser load ?	☐	☐	Manual panels can’t operate for lesser sewage loads.
6	Do you wish to get operational data from STP ?	☐	☐	Only Indus micro-processor panels record all operational data.

We at INDUS always educate our clients about their exact requirement.
Our offers are comprehensive and cover all the issues raised above.
Our plants are 100% automatic with operator presence for just one hour every day.
Call on us TODAY for a trouble free & happy STP use.

INDUS STPs have all the required process equipment and tanks.
With INDUS STPs there is no need to verify with the checklist.
INDUS STP: The best you can buy at most affordable capital & operating cost