

ADVANCED INDEPENDENT

SEWAGE TREATMENT SYSTEMS

FUTURE GENERATION BIOLOGICAL METHODS



50 Years of
Complete Solutions Of Waste Water Treatments

Importance of solving the sewage treatment problem

At present, the environment pollution with products of human life activity in densely populated areas is reaching the critical level. This leads to poisoning of water horizons. The problem is less acute in settlements having a centralized sewerage system. However, not all populated areas are able to build new sewage treatment facilities or to connect to a centralized sewerage system. In such places, the problem of sewage treatment is paramount. Further, it should be understood that a centralized sewerage network is, though necessary, but not completely ecologically safe system – it is not only civilization that comes to your home together with it. Concurrently, you get a "creephole" for penetration of malignant bacteria that propagate intensely in sewers. Disadvantages of the centralized sewerage include also the fact that some part of sewage, as it is transported, penetrates into ground from the sewer and pollutes soil. One cannot also help recalling the odour from sewerage manholes along the sewer route. Only one conclusion suggests itself.

Sewage must be treated, as far as possible, at the places of their origin. But not everyone knows how to do it.

There were many who tried to create local sewage treatment facilities (LSTF). But in the overwhelming majority of cases, the treatment process was only simplified, and sometimes was ignored completely. Our experience shows that the importance of solving the sewerage treatment problem is understood by many people. But their good intentions often come across adventurers dealing in treatment facilities.

Unfortunately, only professionals can differ a good sewage treatment facility from an evident fake. In order it would be more difficult to deceive you by selling deliberately an inoperative plant, we will try to present main criteria for selection of local sewage treatment facilities.

First — treatment method.

Today, the optimum method for treatment of household sewage is biological treatment. No one disputes this postulate now. Biological treatment using an efficient technology can solve practically all sewage problems. It is generally acknowledged that the most efficient biological treatment technology is the aerobic process, that is, the process that uses bacteria "breathing" oxygen dissolved

elaborately in sewage. Quantity of bacteria colonies involved in this process is hundreds times higher than in anaerobic (without access of oxygen) technologies. A significant advantage of aerobic processes is that they do not allow growth of malignant bacteria and they are free of bad odour. Anaerobic systems also have the right of existence today but few of them can comply with Russian standards. However, this technology allows development of not bad "economy class" plants using efficient biological activating agents.

The most efficient of aerobic technologies today are SBR systems. The best representatives of these systems are capable to work even in recirculating water supply systems. Without particularizing, SBR technologies comprise alternation of aerobic and anoxide processes in the same volume, with different quantities of dissolved oxygen. Not all SBR systems are equally good, though any of them, even the simplest, constitute always a step forward from traditional aeration technologies.



Second — material of treatment plant casing.

It must be strong, resistant against chemical and biological corrosion and must have definite heat-insulation properties. It should be noted that ferrous metals and concrete are susceptible to corrosion and biocorrosion and do not retain heat. Certainly, one can use a concrete base with an additional water-repellant heat-insulating layer and stainless metal or plastic facing but this entails higher construction costs and low effectiveness of construction work.

However, there exists an alternative – material complying with all necessary requirements, that is, foamed polypropylene plastic panels. This material has many advantages as compared to others, which makes it unique for construction of local sewage treatment facilities. Strength of these panels allows installation of local sewage treatment plant in any soils without concrete reinforcement. Their service life exceeds 50 years.

And as for "tale-tellers", we will upset them at once – it is a too tough nut to crack for rodents, and the plants do not float above the surface because they are always filled with water.

Third — aeration system.

Many aerobic LSTFs use a perforated tube as an aeration element. Efficiency and service life of such construction are rather low. The thing is that, after air pressure is released (process pause), sewage with non-decomposed so far organics penetrates into the perforated tube through its holes, and such organic remnants can block some of the holes from inside when the compressor is restarted. With time, the number of holes in the aerator can be counted on the fingers of one hand. Naturally, aeration is reduced by an order of magnitude.

In Russia, development of SBR systems was hindered for a long time due to unavailability of aeration elements

capable to operate with process pauses without a decrease in efficiency. And the situation changed at last.

The domestic market saw film membrane aerators, in particular, ATE-65, that are able to operate in SBR systems for longer than 10 years!!! After the compressor turn-off, all pores of the film membrane aerator are closed under action of water pressure, and the film envelops the frame of the element preventing liquid from penetrating inside the plant. As air is supplied, the film is inflated, and pores become open. A process of continuous self-cleaning of the aeration elements takes place, including removal of external biological fouling.

Fourth — compressor used.

It must be reliable, low-noise and long-lasting. For low-volume LSTFs, membrane compressors are suitable which can operate non-stop for more than 2 years. Compressors manufactured by HIBLOW, Japan, are one of the leaders in this area in many respects.

Fifth — availability of accumulating volume.

Household sewage is characterized by great non-uniformity. This is quite understandable because we do not eat continuously and do not wash 24 hours a day. Therefore, for optimum operation of the treatment plant, it is necessary that sewage is first collected in some volume (reservoir) and then supplied for treatment. This is especially important when we take a bath or a shower. Uniform sewage supply for treatment is an obligatory condition of efficient operation of the plant. Otherwise, some part of biomass will be carried away from the plant together with treated water, which is unallowable.

Sixth — sewage pumping method.

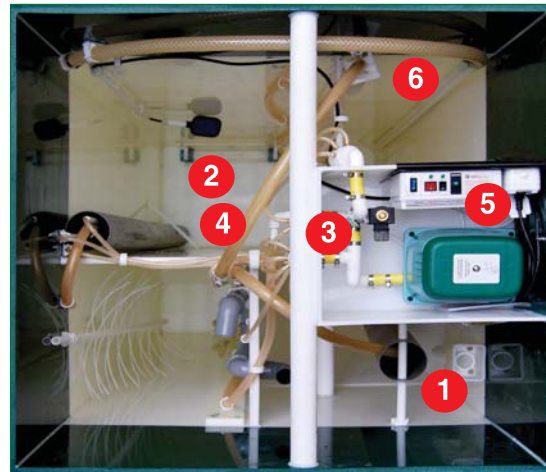
In case centrifugal pumps are used, bacteria chains will be destroyed, and biomass will lose its efficiency. At present, the most "delicate" (non-destructive) pumping method is an airlift. Its principle of operation is simple – air bubbles in the tube, when lifting, entrain water particles.



Distinctive features

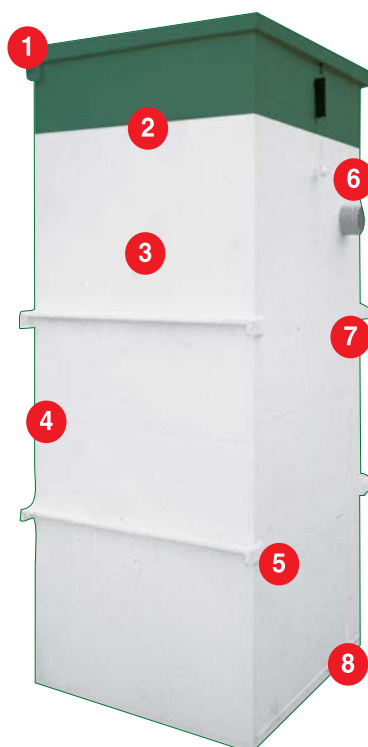
- Very high degree of clearing (more than 95 %)
- Resolved dump of the cleared water in reservoirs of fish facilities values
- Guaranteed smells absence at work
- Unique system of disinfecting
- Small weight - absolute water resistance of the station case
- High mechanical durability - corrosion absence of the case and technological elements
- Additional heat isolation it is not required
- Simplicity in service
- Convenience of transportation and installation (the special equipment is not required)
- Additional concreting is not required at installation
- Low cost installation
- Long safety of a biomass without receipt of drains (at periodic operation)
- Long term of operation (more than 50 years)
- Ecological safety
- Quantity of served persons from 1 up to 1000 and more

1. The final step of clearing is accessible to the visual control that excludes hit of the crude water in an environment.
2. Application membrane film aerator, which warranty period of operation exceeds 10 years!!!, has allowed to work confidently with the technologies based on a principle of faltering aeration (SBR), and, as consequence, - increase of efficiency of clearing.
3. Application of switching valves has allowed to intensify technology of clearing.
4. Owing to application airlift at swapping the biomass does not collapse. Absence of mechanical units considerably raises the work reliability of system as a whole.
5. The station automatically adjusts operating modes according to volume of acting drains.
6. The aerobic stabilizer of surpluses of active silt allows to use waste as fertilizer at once after its removal from station. Removal of the stabilized silt occurs regular airlift, that allows to do without sewage machine and the additional pump equipment.



A modelling number of clearing stations by Canadian Crystalline manufacture is developed in view of individual needs for various conditions of operation.

1. The cover is above a surface of the ground that allows easily to supervise and serve station, and also the easy oxygen approach in a compressor compartment is provided.
2. The station is executed in the uniform case that reduces overall design dimensions and reduces losses of heat to a minimum.
3. The integrated structure and unique characteristics of polypropylene applied to the case allow to use station in climatic conditions of Russia.
4. Special technology of welding guarantees full water resistance of the station case and its high mechanical durability.
5. Small overall dimensions of station, assembly loops and small weight provide convenience of transportation and installation.
6. An opportunity to assign cleared water directly from station self flow or compulsory way.
7. Strong polypropylene case with edges of rigidity allows to mount station without additional concreting.
8. The plastic case guarantees absence of corrosion, ecological safety and excellent heat insulation.





Maintenance of the plants

Automated monitoring and unified processes of Canadian Crystalline ensure long-time and reliable operation of sewage treatment plants and allow elimination of frequent maintenance except for some simple operations such as:

Once every 3 months:

- removal of sludge from the settling tank by means of a mammoth pump;
- cleaning of the untreated water mammoth pump and the large-size garbage filter;
- cleaning of the secondary settling tank walls;
- cleaning of the air blower filters.

Once every 6 months:

- removal of sludge from the settling tank by means of a drainage pump (unless sludge was removed by a mammoth pump after 3 months);
- cleaning of the hair trap in the aerotank.

Once every 5 years:

- cleaning of the equalizing tank and the aerotank from stabilized sediment.

Once every 10 years:

- replacement of aeration elements.

Excessive activated sludge generated during operation of the sewage treatment plant and the accompanying sediment are pumped out periodically and carried away for disposal; they can be used also for composting and subsequent introduction into the soil as a fertilizer on land plots near cottages or farms.

Highly skilled specialists of Canadian Crystalline maintenance service will carry out this work at any time as convenient for you. Service motorcars of Canadian Crystalline are completely provided with all necessary equipment for maintenance of sewage treatment plants of any capacity.

Model	Quantity of served persons	Productivity (m³/d.)	Maximal dump (l)	Capacity of the compressor (Wt)	Overall dimensions, mm						Weight Kg
					Basis		Height				
					length	width	case	with mouth	with a cover	with a fungus	
CC-SBR1-S	5	1,0	250	60	1040	1000	2325	2325	2360	2460	230
CC-SBR1-M					1040	1000	2470	2470	2505	2605	250
CC-SBR1-L					1160	1000	2995	2995	3030	3130	330
CC-SBR1.6-S	8	1,6	350	80	1500	1040	1995	2325	2360	2460	350
CC-SBR1.6-M					1500	1040	1995	2470	2505	2605	370
CC-SBR1.6-L					1500	1160	1995	2995	3030	3130	430
CC-SBR2-S	10	2,0	550	100	2000	1040	1995	2325	2360	2460	340
CC-SBR2-M					2000	1040	1995	2470	2505	2605	345
CC-SBR2-L					2000	1160	1995	2995	3030	3130	425
CC-SBR3-S	15	3,0	650	120	2500	1040	1995	2325	2360	2460	400
CC-SBR3-M					2500	1040	1995	2470	2505	2605	405
CC-SBR3-L					2500	1160	1995	2995	3030	3130	570
CC-SBR4-S	20	4,0	850	150	2000	1540	1995	2330	2360	2480	420
CC-SBR4-M					2000	1540	1995	2470	2505	2605	430
CC-SBR4-L					2000	1660	1995	2995	3030	3130	530
CC-SBR6-S	30	6,0	1200	240	2160	2000	2100	2330	2360	2480	660
CC-SBR6-M					2160	2000	2100	2470	2505	2625	670
CC-SBR6-L					2160	2000	2100	2995	3030	3150	700
CC-SBR8-S	40	8,0	1500	270	2500	2160	2100	2330	2360	2480	755
CC-SBR8-M					2500	2160	2100	2470	2505	2625	770
CC-SBR8-L					2500	2160	2100	2995	3030	3150	810
CC-SBR10-S	50	10,0	1800	300	3000	2160	2100	2330	2360	2480	825
CC-SBR10-M					3010	2160	2100	2470	2505	2625	840
CC-SBR10-L					3010	2160	2100	2995	3030	3150	870
CC-SBR15-S	75	15,0	2300	400	4010	2160	2100	2330	2360	2480	1035
CC-SBR15-M					4010	2160	2100	2470	2505	2625	1050
CC-SBR15-L					4010	2160	2100	2995	3030	3150	1100
CC-SBR20-S	100	20,0	2800	600	3010x2	2160x2	2100	2330	2360	2480	1575
CC-SBR20-M					3010x2	2160x2	2100	2470	2505	2620	1600
CC-SBR20-L					3010x2	2160x2	2100	2995	3030	3150	1650
CC-SBR30-S	150	30,0	4600	800	4010x2	2160x2	2100	2330	2360	2480	2070
CC-SBR30-M					4010x2	2160x2	2100	2470	2505	2620	2100
CC-SBR30-L					4010x2	2160x2	2100	2995	3030	3150	2200



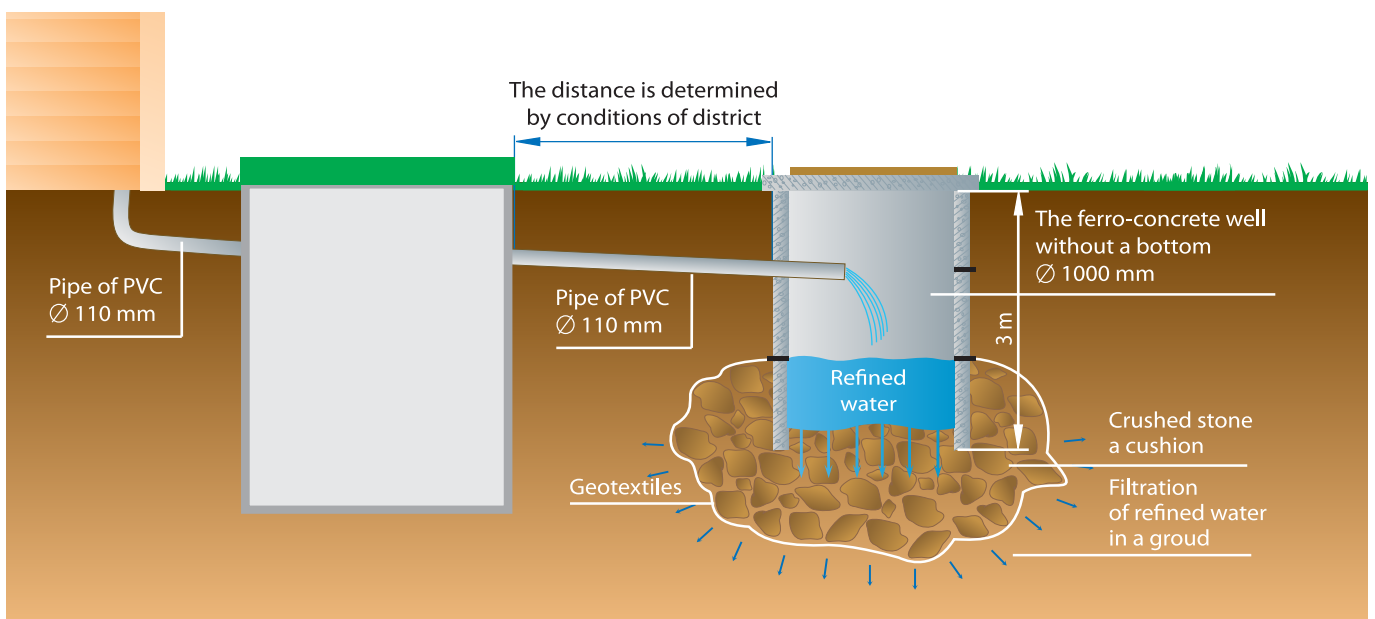
Treated water draining options

Treated water draining options are conditioned by different types of soil at the place of sewage treatment plant installation:

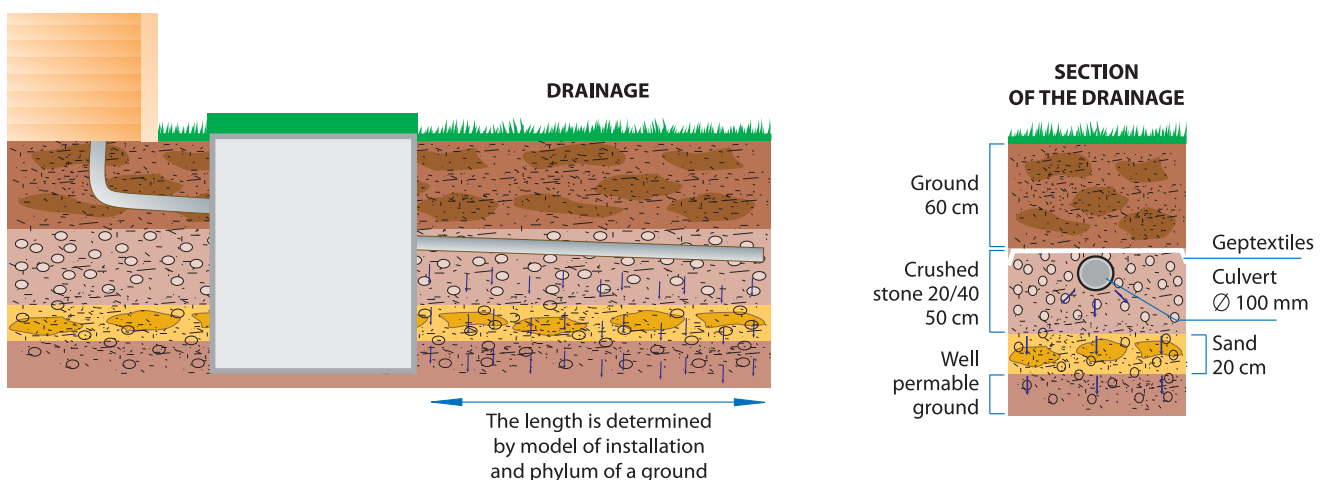
- well-filtering, having a high filtration coefficient (sand, loamy sand)
- badly filtering, having a low filtration coefficient (loam, clay)

1. Installation in sandy soil or well-penetrable soil

a) treated water is drained to the drainage well by gravity



b) treated water is drained through a perforated pipe by gravity





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