

# **Technical task for project development for construction of a new buffer tank and related infrastructure - pump station and sedimentation reservoir for pharmaceutical wastewater treatment plant of JSC „Grindeks”**

## **Short description of the problem**

Composition, flow rate, biodegradability and toxicity of pharmaceutical wastewater of JSC “Grindeks” fluctuate considerably from day to day depending on batch stages and production intensity. Biological treatment system suffers from regular peak (shock) loadings of pollutions which has negative impact on stability of biological treatment system and makes it difficult to reach effluent standards. The existing buffer tank with volume of 200 m<sup>3</sup> allows to equalise pollution load and the wastewater flow for short period of time (about 20 h), which is not sufficient to ensure stable operation of wastewater treatment plant (WWTP). Construction of a new buffer tank with sufficient volume to accumulate at least the average weekly flow (min 2000 m<sup>3</sup>) of industrial wastewater is deemed necessary. **It should be noted, that continuous operation of WWTP should be enabled during the construction of a new buffer tank.**

Existing pump station and sedimentation reservoir buildings are in bad technical condition and they should be rebuilt.

## **Requirements**

- ✓ Total volume of a new buffer tank: **min 2 000 m<sup>3</sup>**.
- ✓ Design: Closed type, cylindrical or rectangular, two sections for independent operation.
- ✓ Location: limited area for construction. Above ground construction is preferable. Height of a new buffer tank should be equal to height of existing buffer tank (water level approximately 7 m).
- ✓ Connection with existing infrastructure – industrial wastewater system and existing buffer tank should be included in the project. New pump station and sedimentation reservoir (sand receiver) also should be designed and included in technical project.
- ✓ **Sedimentation reservoir and pump station:** Sedimentation reservoir with volume 60 m<sup>3</sup> should be located below the level of industrial wastewater system and should be equipped with level control system, which manages (drives) pumps in another building (pump station). At least 2 pumps (non submersible) should be installed, recommended productivity of each pump 45 m<sup>3</sup>/h. Pumps should be equipped with mechanical filters (holes of the sieve 8 mm). Cleaning of filters could be done manually by hand with possibility to switch wastewater flow to other filter during the cleaning process. Filters should be equipped with clogging indicators. Drainage pump should be installed in the pump station. Room, where pumps are located, should be equipped with warning system that gives signals about potential flooding risks. Temperature should be monitored in the pump station, heating system is desirable. All sensors should be connected to existing central process control system. Operation of existing pump station and sedimentation reservoir should be provided until the switching to new devices pass or other temporary solution should be offered. During construction works of a new buffer tank, pump station and sedimentation

reservoir, operation of WWTP and existing infrastructure should be ensured. Connection to the new buffer tank should be done “stepwise” without stopping or disturbing wastewater treatment process. Old buildings of pump station and sedimentation reservoir should be demolished as soon as it becomes possible.

- ✓ As there could be contact of equipment with explosive vapour, all equipment, installations, lighting, ventilation etc. should be in appropriate ATEX performance.
- ✓ Materials used in construction: chemically stable, compatible with pharmaceutical wastewater, solvents (for example ethanol, methanol, isopropanol, acetone, acetonitrile, dimethylformamide, methylene chloride etc.), acids and bases. All constructions from metal that come in contact with wastewater or their vapours should be made from stainless steel AISI 316.
- ✓ Ventilation: ventilation system of buffer tank should be included in the project. Emission of volatile organic compounds into atmosphere should be eliminated.
- ✓ Operation and maintenance: cleaning possibility of buffer tank from solid sediments should be provided. Addition of water for washing purposes should be involved.
- ✓ Sampling: sampling points from individual compartments should be provided.
- ✓ Mixers – homogenous mixing of wastewater should be ensured in each compartment.
- ✓ Process control: Control system of a new buffer tank should be integrated into the existing WWTP process control system.
- ✓ All valves should be equipped with actuators, which could be managed from central control system. Possibility of manual control also should be ensured.
- ✓ Additional equipment: each of section of the new buffer tank should be equipped with temperature sensor, level sensor, pH sensor. All sensors should be connected to existing process control system. Option to add neutralising agent or dilution water should be provided.

Additional information is available after request.

The possible performance of a new buffer tank is represented in the attachment – ***Principal scheme***. It should be used as guidelines, but alternative solutions are also acceptable and will be considered. Additional options could be included in the project if they will improve the operation of WWTP.

#### Operation mode 1:

The new (designed) buffer tank is used with full capacity, pharmaceutical waste water is accumulated, pollution is equalised. It is possible to use the accumulated wastewater in vacation periods when the production stops to ensure continuous operation of WWTP.

V1 in position a; V2 in position a or b; V5 closed

Through the overflow pipe, the wastewater flows into an existing buffer tank where the existing level control system is used.

#### Operation mode 2:

Each section (compartment) of a new buffer tank is used separately. Wastewater are accumulated and stored in one section, while pumped out from second section. Sampling and

chemical testing of collected wastewater from each compartment gives opportunity to predict treatment performance and dilute wastewater pollution if necessary.

V1 in position a; V2 in position a or b; V3 and/or V4 open; V5 open

Operation mode 3:

A new buffer tank is excluded from the chain of wastewater flow for cleaning or maintenance. Only the existing buffer tank is used for equalising wastewater flow and pollution load. The WWTP works like before the construction of the new buffer tank.

V1 in position b; V5 closed

## **Additional requirements**

1. Project development company (further in text Performer) should develop complete documentation of constructing idea and approve it by JSC “Grindeks” (further in text Customer). The Performer undertakes to approve the Construction Project's solutions and specifications with the Customer prior to approval with the institutions and landowners. Performer should cover all costs related to the reviewing and approval of project documentation in the responsible institutions (third parties).
2. Control cost estimate should be prepared and submitted.
3. Performer will have to submit and receive documentation of the construction project approval by the Riga City Construction Board.
4. Performer undertakes to receive a conformation on the fulfilment of the design conditions in the Building Permit and together with the Builder and the Customer to ensure fulfilment of the conditions for the commencement of construction work by receiving an appropriate approval in the Building Permit.
5. Performer should carry out the author's supervision until the Object is put into operation and if required make necessary changes into project, by obtaining Customers agreement. The Customer has the right to refuse author's supervision services, if not necessary in accordance with legislative requirements. The author's supervision costs must be included in the estimate as a separate item.
6. The Performer must ensure that the Project documentation is mutually consistent with other Work Projects or Construction Projects, if any.
7. JSC “Grindeks” will provide the current topographical map of the territory as well as plan of the territory and engineering networks.
8. The planned maintenance and operation costs (economic justification) of the new buffer tank and related infrastructure should be included in the project.
9. Time schedule for the project development should be included, showing:
  - a. time needed to develop the initial project
  - b. the time needed to make necessary changes and correction in the project
  - c. time needed to prepare final project, that is approved by all responsible institutions
10. Project documentation must be submitted electronically + 2 originals + 2 copies.
11. To receive additional sensitive information, it will be required to sign confidentiality agreement with Customer.
12. Performer has to enclose certificates that confirm the competence of the author of the project.