

## Jieyuan D.W.T.P (Sludge treatment) (China)

**Name:** Drinking Water Treatment Plant Jieyuan  
**Client:** Tianjin Water Works Group Co., Ltd.  
**Situation:** Tianjin (China)  
**Start-up date:** 2010



### Design data

Water supply capacity	500.000 m <sup>3</sup> /d
Dry solids production	42.820 kg/d
Maximum water discharge	5.091 m <sup>3</sup> /h (peak)
Maximum sludge discharge	780 m <sup>3</sup> /h (peak) 595 m <sup>3</sup> /h (average)
Raw water maximum turbidity	58 NTU
Raw water color	25

### Existing filter backwash

Water from existing filters discharges into two tanks with 50x13x4 m unit dimensions, resulting 2.600 m<sup>3</sup> each tank.

Each tank is equipped with sludge scrapers and submersible pump of 70 m<sup>3</sup>/h at 7 w.c.m. unit capacity for sludge removal.

### Recycling pumping station

This p.s. is equipped with 6 (4+2) submersible pumps with 450 ÷ 850 m<sup>3</sup>/h at 19 ÷ 10 w.c.m. unit capacity

### Regulating tank

It is divided into two chambers, each one of 20x8x3.5 m, resulting a total volume of 1.120 m<sup>3</sup>. Each chamber is equipped with two 3.0 kW submersible mixers and 3 (2+1) submersible pumps with 180÷200 m<sup>3</sup>/h at 7'8 w.c.m. unit capacity, one of them controlled by variable frequency drive.

Submersible pumps deliver sludge from Regulating Tank to settlers, where two lamella settling tanks are constructed.

### Lamella settling tanks

These tanks are designed for future requirements.

Each tank has been designed to treat a maximum flow of 400 m<sup>3</sup>/h, with settling zone 8,20x 16,80m

At the bottom, on the outlet zone of each tank two sludge collection pits are built per tank.  
Over flow is conveyed to DWTP head.

### Equalization tank

Sludge removed from settlers is discharged into a 720 m<sup>3</sup> equalization tank. The tank dimensions are 15.70x15.30x3.00 m and is equipped with two(2) 3.0 kW submersible mixers for sludge homogeneization.

4 (2+2) progressive cavity pumps with 20÷60 m<sup>3</sup>/h at 11 w.c.m. unit capacity with flow control by using variable frequency drives are installed.

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### Dissolved air flotation units

The sludge is delivered into three 3 (2+1) dissolved air flotation units.

Thickeners have 60 m<sup>3</sup>/h design capacity and 80 m<sup>3</sup>/h maximum unit hydraulic capacity.

Flotation units include flocculation device for polyelectrolite dilution and incoming sludge mixing.

Flotation thickeners are also equipped with surface scraper to collect floated sludge, lammella packages, bottom sludge withdrawal point controlled by pneumatic operated butterfly valve, and equipped with bottom screw conveyor.

The automatic dilution equipment is divided into three chambers and mixing is carried out by means of two vertical shaft mixers. Total volume is 4.000 l.

Polymer dilution is dosed using 4 (2+2), progressive cavity pumps, each one with 440 ÷ 1.100 l/h capacity, variable frequency drive controlled. Overflow is conveyed to DWTP head.

### Degasification tank

Sludge at 35 kg/m<sup>3</sup> concentration is collected from dissolved air flotation thickeners to a degasification tank of 266 m<sup>3</sup> volume, equipped with one 5.50 kW submersible mixer, one ultrasonic level meter, one suspended solids transmitter and two float level switches.

Sludge stored in degasification tank is withdrawn by means of 3 (2+1), progressive cavity sludge feeding pumps, each one with 10÷35 m<sup>3</sup>/h at 11 w.c.m. unit capacity with flow control by using variable frequency drives.

Each pump deliver sludge into one centrifugal decanter.



### Dewatering process

It is designed to run with 3 (2+1) centrifugal decanters with 29 m<sup>3</sup>/h maximum hydraulic unit capacity.

For dewatering process a polymer dosage station is provided.

This station is equipped with one (1) automatic polyelectrolyte dilution unit, with 15 kg/h maximum unit capacity and 6.000 litres unit volume.

The automatic dilution equipment is divided into three chambers and mixing is carried out by means of two vertical shaft mixers.

Also, 3 (2+1) progressive cavity polymer dilution delivery pumps, are installed, each one with 400÷1.500 l/h at 15 w.c.m. unit capacity with flow control by using variable frequency drives.

Sludge cake from centrifugal decanters is collected using shaftless screw conveyor.

Dewatering facilities are equipped with one 14 m horizontal type screw conveyor with 10 m<sup>3</sup>/h unit capacity.

The dried sludge is collected and transported by trucks 8 Ton capacity.

Centrifugal decanters filtrate is collected and delivered into discharge network

Facilities are completed by installing electromagnetic flowmeters for sludge and polymer dilution control.