

CPS 10000

Wastewater Treatment System

Wastewater Details and System Description

European Box Company

CTECH Europe Limited

Unit 2, Rovert House Clayhill Industrial Park, Watertower
Clayhill Industrial Park, Watertower Road
South Wirral CH64 3US

Factory Details & Wastewater Treatment Plant Requirements

Volume of Wastewater Generated – Between 24m³ to 30m³ per day
 Percentage Ink Wastewater – 80%
 Percentage Glue Wastewater – 20%
 10m³ Batches Treated – 3 batches per day, all completed during day shift operation
 Previous Type of Treatment System - None
 Factory Goal for New System – Treat Wastewater in one shift and meet sewer discharge consent limits
 Was Factory Goal Achieved - Yes
 Factory Contact – Ian Constable

Test Results:

Testing of the wastewater was conducted prior to the selection of the treatment system. Initial laboratory testing was conducted on wastewater collected from the factory collection pits. This was successful and therefore followed-up by an on-site Pilot. The Process Guarantee on the project used the analysis below for the basis of the guarantee.

Sample 1 was the Untreated Control and Samples 2, 3 and 4 were all treated with CTECH PolyClay chemistry. All samples were submitted to a third party test house, (AIControl Laboratories), for independent analysis of:

COD
 Suspended Solids
 Sulphate
 Copper
 Zinc
 Fat, Oil & Grease
 pH

Test	Sample 1 (Untreated)	Sample 2	Sample 3	Sample 4	Discharge Consent
COD (mg/l)	9,660	1,440	1,450	1,450	10,000
Suspended Solids (mg/l)	4,600	10	10	15	2,500
Sulphate (mg/l)	96.6	227	224	351	1,000
Copper (mg/l)	7.610	0.0548	0.0658	0.0569	3
Zinc (mg/l)	0.536	0.0358	0.0443	0.0351	5
Fat, Oil & Grease (mg/l)	57.7	7.46	7.83	6.90	300
pH	5.32	6.63	7.03	6.61	6-10

Results in **RED** are above discharge consent.

AIControl Analysis Report Number: 131205-133-MCERTS-COMPLETE-2013-12-11

System Operation Description

A. Equalisation Tanks

Once the wastewater is collected a mixer is used to homogenise it. Two 36m³ tanks are proposed to help ensure the wastewater being treated is consistent with each batch. Past experience has demonstrated that effluent from a Corrugated Box Company changes on a continuous basis. The use of a single Equalisation Tank will still have variations in the contamination level of the effluent, regardless of its size. With a two Equalisation Tanks the operator can treat one full tank while the empty one is filling up. This will allow the operator to treat a succession of batches at the most economical rate, and be assured that each batch is treated properly.

B. Treatment Tank

Wastewater will be transferred from the equalisation tank manually by an operator or by the Control Panel using a hydrostatic pressure level controller in the treatment tank with the automatic option. Once the operating level has been reached the Treatment Tank mixer will be activated by the operator or be activated by the level controller under the automatic operation option. The pH will be adjusted automatically to the required level. The next step in the treatment process is to add PolyClay. When the PolyClay addition and mixing process is complete, the mixer will shut off and the wastewater will be left to settle for a pre-set time. The clear effluent will be processed through the bandfilter for discharge to sewer and sludge will be transferred to the Sludge Tank for processing through the filter press. A 10m³ Treatment Tank will be used to process the effluent.

C. Bandfilter Assembly

Once the pre-set settling time is completed the decanting cycle will start. The clean water valve opens and the decant transfer pump is activated. A level control determines the correct decant level. The clean water is polished through a band filter. The top of the bandfilter is covered with filter paper. The bandfilter and filter paper index forward automatically when full.

D. Sludge Tank

Once the decanting operation is complete, the sludge will be transferred to a 10m³ sludge holding tank, using air operated double diaphragm pump controlled by hydrostatic pressure level controllers in the Treatment and Sludge Tanks. When the transfer of the sludge from the Treatment Tank is complete and there is sufficient volume of sludge in the Sludge Tank, the filter press feed pump will be activated. The Sludge Tank is agitated to assure a homogeneous mixture is fed to the filter press. The use of the Sludge Tank allows for treatment of effluent to continue to the next batch because the Treatment Tank does not empty into the filter press.

E. Filter Press

The filter press hydraulics system is operated at 620 - 700 bar to assure proper closure. One 650 litre filter press has been proposed, expandable to 1,000 litres. The filter press comes equipped with an automatic ramp up control that allows the sludge to be incremented into the filter press on a systematic basis. This allows for better quality of sludge produced and extends the life of the filter cloths. The estimated solids content of the filter cake from the filter press will be 50% or higher. A Minimum of 7 Bar Air Pressure is required for optimum operation. An automatic plate opening/closing mechanism via pendant control has been included for ease of operation. The Filter Press has been designed to allow expansion to 1000 litre capacity.

3. CPS 10000 System - Component Listing

2 x Equalisation Tank Assembly

- 36m³ storage capacity – flat bottom
- Baffles, Closed top
- Mixer, stainless steel shaft and impeller
- Level Control – Hydrostatic Pressure
- Polypropylene construction

Treatment Tank

- 10 m³ treatment capacity – conical bottom
- Baffles, Closed top
- Polypropylene construction
- Mixer, Stainless steel shaft and impeller
- Level Control – Hydrostatic Pressure
- Dilution Valve

Sludge Tank

- 10 m³ capacity - conical bottom
- Baffles, Closed top
- Polypropylene construction
- Mixer
- Level Control - Hydrostatic Pressure
- Polypropylene construction

Control Panel

- Automatic operation and Voltage to customer's specification
- Includes remote access monitoring/software updates via SIM

PolyClay Dosing Unit

- One tonne capacity
- Controlled by load cells for measured accuracy

Dust Extraction Unit

- Dust extraction for PolyClay

Band Filter Assembly for Clear Water

- Stainless steel and polypropylene construction
- 1000 mm wide x 1500 mm long
- Collection tank for filtered water
- 1 x skip for collection of spent filter paper
- Above ground sump and pump assembly for clear water

Filter Press – 650 litres (Capable of expansion up to 1,000 litres)

- 650 litre capacity
- Epoxy coated steel frame
- Double acting air/over Oil hydraulic system
- 25 Chamber 1000mm x 1000mm plates - polypropylene
- 1 x sludge skip for collection of filter cakes
- Plate moving mechanism by pendant control
- Standard floor platform for access to open, close and wash filter press
- Automatic drip tray/bomb doors
- Jet wash curtain
- Above ground sump and pump assembly for clear water

Filter press Pressure Ramp-Up Control Panel

- Steps filter press feed pump in progressive pressure increments for filling

Work Platform – Treatment and Sludge Tanks

- Provides operator work station
- Visual access to treatment and sludge tank
- Control panel access

pH Control System

- pH meter (in main control panel)
- pH probe
- Coagulant dosing pump
- Caustic dosing pump
- Self contained module – complete with hoses and fittings.

Pumps

- Plant to EQ Tanks - 2" air diaphragm pump
- EQ tanks to Treatment Tank - 3" air diaphragm pump
- Treatment Tank to Sludge Tank - 2" air diaphragm pump
- Treatment Tank to Bandfilter - 1 ½" air diaphragm pump
- Sludge Tank to Filter Press – 2" air diaphragm pump
- 2 x Collection Sumps to Treated Water Tank - 2" air diaphragm pump

Optional Extras:

Compressed Air Booster

This will boost the compressed air feed into the system ensuring that the filter press receives the required minimum pressure of 7 bar. This item is supplied complete with pressure gauges for inlet/outlet pressure, is maintenance free and requires no electrical connection.

- Inlet/Outlet: ½ inch
- Pressure Ratio Increase: Maximum 2
- Maximum Supply Pressure: 10 bar

Elevated Filter Press Platform

- Allows extra space under the filter press if required
- Built to customer requirements

Industrial Wireless Adapter/Access

- Allows remote viewing of control panel screen

Note: No actual operation of the system will be available from the remote access station as it will be configured to VIEW only. Any system alterations must be done at the system control panel. This is to prevent any potential H&S issues and also to prevent conflicting/multiple actions occurring between someone at the remote access station and someone at the system control panel. Customer will need to provide a wireless LAN to which this can connect and also assign up to 3 IP Addresses for CTECH to use with it. No remote hardware is included in these proposal costs, i.e. Customer must provide

4. Site work

Delivery and Set-up

- Delivery of main components. Customer will provide the heavy lifting equipment and operator required to unload and site the components. CTECH will be there to advise the operator.
- Assembling all CTECH supplied components into place
- Customer will be responsible for any civil works required to the designated area

Electrical Installation

- Customer to install required electrical supply to the main control panel
- Interconnecting Electrical Work to all components from the Control Panel by CTECH

Interconnecting Pipe work- PVC

- Customer to install effluent supply to the EQ tanks
- Customer to install mains water supply to the area. Position and flow rate as detailed on the final layout drawings.
- Pipe work and fittings - 50mm diameter
- Customer to supply compressed air feed (7 bar) to the Control Panel
- Pneumatic installation by CTECH
- Discharge point is to be within seven metres of the Treatment Tank
- Any insulation to protect the equipment and/or pipework from freezing is not part of the proposed CTECH scope of supply. It is the responsibility of the customer to assess the risk of freezing. CTECH will not warrant the equipment against damage caused to it either directly or as a result of freezing.
- Any ventilation/cooling required to the designated area is not part of the proposed CTECH scope of supply. It is the responsibility of the customer to assess the risk of over-heating due to high ambient temperatures. CTECH will not warrant the equipment against damage caused to it either directly or as a result of over-heating due to high ambient temperatures.

Commissioning of Effluent Plant

- Inspection of all installed components
- Testing and control of all components from the Control Panel
- Operation Effluent Plant with Mains Water
- Operation of Effluent Plant with Effluent

Training

- Five days start-up and training
- Includes labour, travel and expenses.

