



# SLUDGE TREATMENT TECHNOLOGY

Wastewater treatment is becoming more critical due to diminishing water resources, increasing wastewater disposal costs, and strict discharge regulations that have lowered permissible contaminant levels in waste streams. Sludge disposal is a very important stage for municipal and industrial water and wastewater treatment plants. The essential point of sludge disposal is the sludge dewatering. The main aim in sludge dewatering is to minimize the water content in the sludge cake, in most economical way. The selection of the appropriate sludge-dewatering technique depends on the characteristics of the sludge to be dewatered, available space, and moisture content requirements of the sludge cake for ultimate disposal. For a good dewatering, size and firmness of the sludge agglomerates are important, so that these remain porous during the compression. Flocculants are often used to achieve as high as possible drying material contents at the machine dewatering and must be specifically coordinated with the accruing sludge. Filtration is the most widely used method in the treatment of sludge produced by wastewater treatment. It can consist just in drainage through sand beds or it can be mechanical under vacuum middle or high pressure conditions which require more sophisticated equipment.

Astim offers different sludge treatment equipment for different applications. These equipment can be classified as:

- Chamber Filter Presses
- Belt Filter Presses
- Gravity Belt Thickeners



## CHAMBER FILTER PRESSES

Pressure filtration is a very cost effective way of producing sludge cakes with high DS concentrations, along with an extremely high degree of clarity in the filtrate. Because of the simplicity and flexibility, the Chamber Filter Press is the most used and reliable machine for solid / liquid separation and sludge dewatering plants.

Chamber Filter Presses accomplish three goals in their applications:

- Low cost disposal in the case of wastewater sludge
- Reduced cost from further drying of the cake as a product in the case of industrial slurries
- Purified filtrate with a high enough standard in the case of producing a liquid

Astim Chamber Filter Presses are designed to meet the growing requirements of the industries and municipalities by providing low investment and operation cost. All presses from small manual ones to fully automated large models are easy to operate and maintain with minimal operator attendance. Astim also provides flexible manufacturing features to customers aspiring their needs and satisfaction due to the custom-made fabrication possibilities.

A Chamber Filter Press with standard features consists of a robust steel frame, a filter plate pack located between a head and an end piece, filter cloths and a closing-opening mechanism. The textile fiber cloths are dressed on each side of the recessed filter plates. After the closing of the press, the plates are pressed and held closely by a closing device. When slurry is pumped into the filter press through the inlet nozzle mounted at the headpiece, the hydraulic pressure concentrates the solids in the chambers, which created by adjacent recesses of plates. The liquid phase of the filtrate permeates through the cloth and is collected along a channel system. As the filter cake accumulates in the chambers, pressure requirement increases. Hence a required cake concentration is achieved by using properly chosen pump pressure and flow rate, in addition to the type of textile cloth and cake thickness, according to the characteristics of the filtrate or slurry. As soon as the flow rate of filtrate has dropped to a predetermined minimum, the pumping period is stopped and the press is opened to discharge the cake, Afterwards the cycle begins again by closure of the press.



*Chamber Filter Presses during operation*



*Detail from Light Curtain for operator safety*



*Sludge is being pressed in the chambers*

## BELT FILTER PRESSES

Belt Filter Presses provide the premium process for continuously converting slurry into a moist cake. The sludge is processed in three distinct stages:

- Flocculation
- Gravity drainage
- Compression and shear

Astim Belt Filter Presses are designed for highly efficient, reliable and simple liquid/solid separation: providing low capital, operating and maintenance costs. With its extended pre-dewatering zone and two perforated dewatering drums Astim Belt Filter Press ensures optimal treatment and compaction of the flocculated sludge.

As a standard Astim Belt Filter Presses have carbon steel with hot dip galvanized or completely stainless steel frame. Heavy duty bearings are used to ensure minimum maintenance requirement and long life. High quality filter belt in polypropylene material is used for high cake dryness and long life. Drive, guidance and tensioning rollers are rubber lined. Rilsan coated compression and shearing rollers decrease in diameter to expose maximum pressure in high pressure zone. These features guarantee highest dewatering results. Precise belt tracking and tensioning systems ensures belt safety and reliable operation. The machine is optionally equipped with detachable covers to provide easy access to moving machine parts.

Astim Belt Filter Presses can be equipped with flocculation chambers where sludge and polymeric agents are mixed before sludge is accepted to gravity drainage zone. This chamber is consisting of a small tank with a slow rotating mixer which ensures efficient mixing. When necessary, additional horizontal flocculator can also be installed in the inlet chamber. This equipment is highly effective for perfect mixing of sludge and flocculants. It also guarantees better distribution of sludge over the gravity drainage zone to obtain high efficient dewatering.



Sludge from Belt Filter Press is conveyed with belt conveyor



Belt Filter Press with detachable covers



Combined Belt Units during manufacturing



Belt Filter Presses during installation



Gravity Belt Thickener and Belt Filter Press as Combined Unit



Gravity Belt Thickener during installation

## GRAVITY BELT THICKENERS

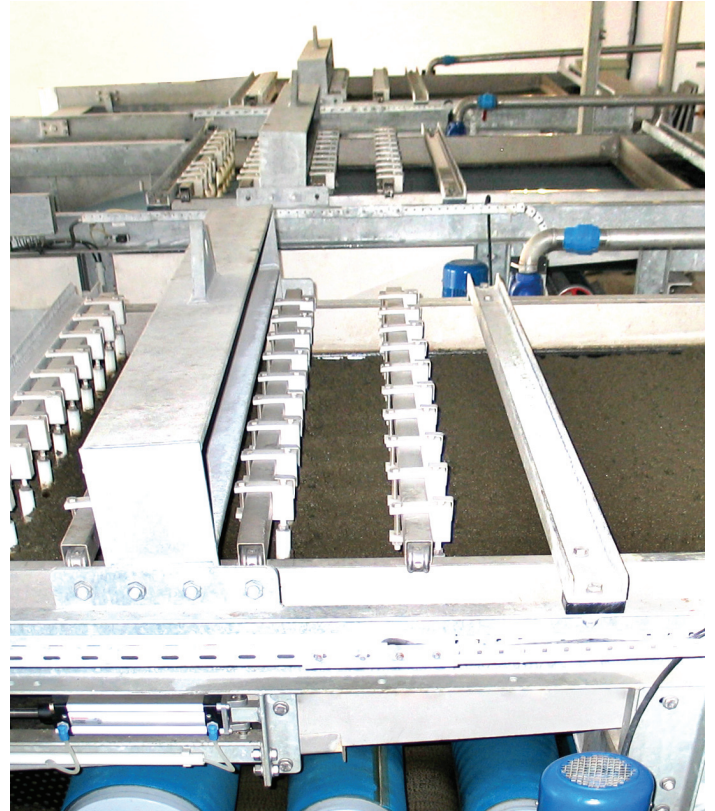
Thickening is the practice of increasing the solids content of sludge by the removal of a portion of its liquid content. A modest increase in solids content can decrease total sludge volume significantly, entailing reduced size requirements for subsequent treatment units. Sludge thickening methods are usually physical in nature; flotation and gravity belts. After the thickener, sludge can be fed to the digestion tanks or dewatering machines.

Belt Filter Thickeners can be used instead of conventional Gravity Thickening tanks to increase the dry solids content of the slurries. Astim Gravity Belt Thickener works as a heavy-duty thickener, with high belt speeds and thin sludge layers. They can easily be combined with Belt Filter Presses by mounting on top of Belt Press.

Optionally; a variable speed mixer ensuring the sludge flocculation with low flocculants consumption can be added to the system.

### Fields of Application:

- Municipal or Industrial Water and Wastewater Plants
- Manure and Agricultural Processes
- Textile Industry
- Ceramic, marble and granite slurries dewatering,
- Mineral slurries dewatering
- Slaughterhouses
- Food Processing
- Filtration of oils and fats
- Filtration of wine and beer yeasts, bakery yeast
- Mining and Metal Industry
- Filtration of juice and syrup in sugar industry
- Pulp and Paper Industry



Effective sludge distribution in gravity drainage zone

### ASTİM Endüstri Tesisleri İmalat Montaj ve Taahhüt A.Ş.

Dilovası O.S.B. 4. Kısım Ceyhan Cad. No:10 41400 Gebze KOCAELİ / TÜRKİYE

Tel: +90 262 724 85 50 Fax: +90 262 724 85 49 E-mail: astim@astim.web.tr

