



## Inclined Plate Separators: Enhanced Settling Solutions In A Small Package

Water Technologies

**SIEMENS**





## Inclined Plate Separator benefits include:

- Low maintenance
- Few moving parts
- 90% smaller footprint than conventional clarifiers
- Low installation cost
- Efficient operation, solids loading and feed distribution
- Quick start-up
- Self cleaning
- Proven performance with effluent turbidities as low as 0.5 NTU
- Counter current design reducing re-entrainment of settled solids from bottom of plates
- Proven experience with flows ranging from 15 gpm to more than 10 mgd utilizing package treatment units
- Integrated treatment systems that include rapid mixing and flocculation
- Optional thickener tank bottom for higher underflow connections

## Inclined plate separator treatment units are effective for:

- Surface water treatment
- Groundwater treatment
- Filter/membrane backwash water treatment
- Membrane/filter pretreatment
- Industrial applications
- Metals removal
- Primary, secondary and tertiary wastewaters

Since introducing Inclined Plate Separators to the U.S. market in 1977, we have installed over 2,000,000 square feet of settling area at more than 100 plate settler installations, providing effective solids separation and turbidity reduction for a wide range of municipal and industrial applications.

The Inclined Plate Separators are designed to remove and thicken suspended and flocculated solids from waters and wastewaters in one complete system while also reducing turbidity. The basic process consists of rapid mixing and flocculation tanks, followed by an inclined plate section with either an integral sludge thickener or a sludge hopper located directly underneath.

### Flash Mixing

In order to break the colloidal suspension and to enhance the settling rate of the particles, coagulants and/or flocculants are added to the raw water. Rapid dispersion of these chemicals is accomplished in a tank equipped with a high shear mixer. The contact time is usually in the range of 30 seconds to 3 minutes, depending upon the application.

### Flocculation

The fine floc particles formed in the flash mixing stage are gently contacted with each other in order to agglomerate them so that larger and more rapidly settling particles are produced. The required flocculation time generally varies from 3 to 30 minutes depending upon the characteristics of the solids, the type of flocculant used, and the application.

### Sedimentation

Following flocculation, the particles are settled out using the inclined settling plates. Flow enters the plates through specially sized feed openings located in the lower sides of the plates. The solids then settle on the surface of the plates while effluent is discharged from the top of the plates. The clarified effluent then flows to a collection trough and over v-notch weirs to ensure even flow distribution. The heavier particles, which have settled on the inclined plates, slide down the plates while the lighter material accumulates on the plates. The lighter material continues to accumulate on the plates until a critical mass is reached at which point gravity causes the solids to slide down into the sludge storage/thickening area below.

### Sludge Storage

The settled particles are stored in a hopper or thickener located directly underneath the plates. The sludge can then be periodically withdrawn from the storage area for further processing and disposal.

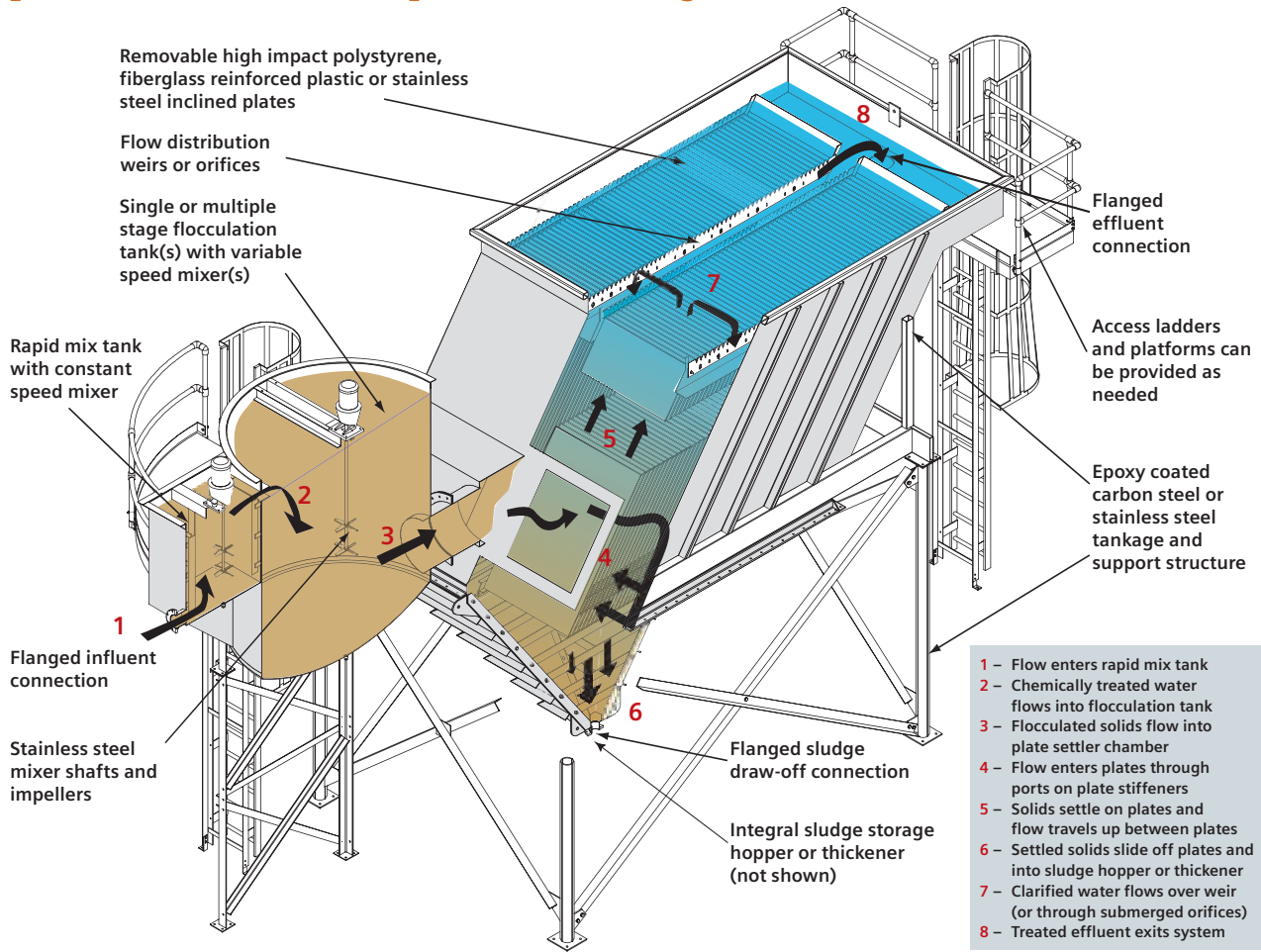
### Sludge Thickening

The addition of a thickener tank, to replace the standard hopper bottom, can greatly improve solids underflow concentrations. Contrary to conventional thickening techniques, there is practically no fluid flow into the thickening compartment—only sludge particles falling through a quiescent body of water. As the solids settle, the flocculated mass comes in contact with slow moving mechanical pickets in the thickening compartment. The mechanism increases the rate of particle growth and decreases the amount of water within the precipitate, thereby producing a dense sludge.

### Experience Makes the Difference

The Inclined Plate Separator treatment units have been successfully applied in water and wastewater treatment facilities (both municipally and industrially) with flows ranging from 15 gpm to more than 10 mgd. No matter how big or small the job, Siemens Water Technologies custom designs and manufactures each system to meet the requirements of the job. With our experience, we're sure to have an inclined plate separator system that will suit your needs.

# Typical Inclined Plate Separator Package Unit



## Industrial Applications

### Power/Electric

- Fly ash/bottom ash sluice water
- Scrubber slurries
- Cooling tower make-up/blowdown water
- Coal pile run-off

### Metal Processing/Finishing

- Electroplating
- Anodizing/etching
- Galvanizing
- Cleaning

### Chemical processing

- Heavy metals
- Metal hydroxides
- Phosphoric acid
- Side stream product recovery

### Microelectronics

- Fluoride
- Etching

### Food and Beverage

- Product wash water
- Process wastewater



Siemens Water Technologies can customize its plate settler package units in almost any size and layout as needed to accommodate nearly any application where conventional clarification has been used in the past, in addition to new applications. On site pilot testing is available via a skid mounted plate separator with capacities up to 120 gpm. Additionally, Siemens has the capacity to offer factory bench-scale/jar testing in a controlled laboratory environment.

The information provided in this brochure contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

East Tel: +1.508.849.4600

Central and International Tel: +1. 515.268.8400

West Tel: +1.719.622.5320

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