clarifiers
thickeners



Integral treatment of effluent with solids in suspension




Clarifiers/Thickeners are mainly specified for the effluents treatment, runoff and waste water generated in the washing process of sand and aggregates, minerals and other production processes related with the activities of the Construction, Mining, Chemical and Environmental industries.

Sludge, clay and fine particles are filtered through a fluidized bed of solid sediments drawn to the bottom by a rake mechanism, and subsequently pumped out of the tank. The clarified water is discharged through the tank overflow launder.

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EFFECTIVE CLARIFICATION AND THICKENING

The highly effective solid-liquid separation provided by **ERAL's Clarifiers/Thickeners** is particularly well suited to treating the **effluents, runoff and waste water** generated by the aggregate, mining, construction, chemical and environmental industries, among others.

The optimal results delivered by **ERAL's** high performance Clarifiers/Thickeners, at rates from three to twenty times more than in conventional tanks, translate into enormous advantages for the user, including a greater settling area or clarifier size, better clarification conditions, higher concentration of solids during discharge, efficient and automatic process control and lower investment costs.

ERAL's highly qualified technical personnel draws from its ample material resources to conduct any necessary laboratory or pilot plant testing to ensure the proper sizing of its Clarifiers/Thickeners as well as the choice of optimal flocculation equipment and the appropriate type of flocculant for each use.

SLUDGE FILTERING

Where the thickened sludge needs to be filtered for subsequent handling as a solid or for reasons of environmental control, **ERAL** supplies proprietary **Press Filters** and designs facilities for comprehensive effluent treatment, based on a thorough study of user requirements and the characteristics of the material.

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Certified under ISO 9001

clarifiers thickeners

12 m and 6 m Ø Clarifiers in tunnel boring

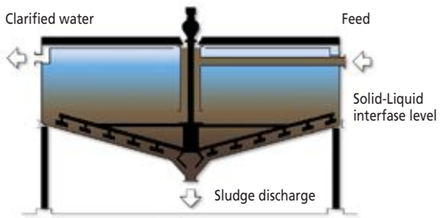
12 m Ø Clarifier and clarified water tank in sand washing process

Kaolin treatment by 10 m and 8 m Ø Thickeners with rakes lifting system

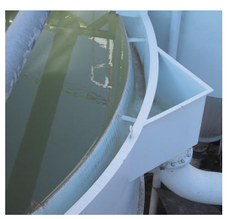
7 m Ø Clarifier in fine sand recovery process

OPERATION

The feed slurry is initially conveyed to an auxiliary tank attached to the Clarifier/Thickener where it is de-aerated and the necessary chemical reagent (flocculant) is added to expedite sedimentation.



The feed slurry/flocculant mix is then introduced into the bottom of the tank through a fluidized bed created by the settling solids and the clarifying area. This ensures the contact between the solid particles and the chemical retained in the bed, intensifying the effect of the reagent. The effluent is driven upward through the fluidized bed to the top of the tank, where the clarified water is evacuated through a peripheral overflow launder.



Clarified water

Sludge discharged

The solid-liquid interface formed in the lower part of the tank is determined as a separation line between the fluidized bed and the clarified water, which is automatically detected and monitored by a number of sensors.

A rake system mechanism located at the bottom of the tank guides the settled sludge into a central discharge funnel, from where it is pumped out of the tank. The frequency and concentration of the discharge is continuously controlled by means of a load detector that drives the sludge pumping system.

CONSTRUCTION

The **Tank** is fabricated in mild painted steel, bolted assembly, supported on a series of steel columns, and fitted with a vision panel to monitor the interface. **ERAL's** modular, screw-on tank design facilitates shipping, assembly and dismantling.

The **Drive Assembly** consists of a gear motor coupled to a central shaft that moves the rakes mechanism, resting on the thickener bridge. The power unit is fitted with all the latest innovations in power transmission to guarantee high drag torque, long life, low power consumption and minimum maintenance.

Optionally, the tank may be supplied with an open bottom for installation on a concrete slab.

Sludge discharge system underneath the tank

INSTRUMENTS AND CONTROL

ERAL Clarifiers/Thickeners are equipped with different devices to optimise operation and ensure effective regulation of the process variables. These devices include an **electronic controller** designed to serve a dual purpose as a torque limiter (for safety) and load detector for the automatic sludge pumping system; a **turbidimeter** (optional) to control the quality of the clarified water; and a **level control** (optional) to monitor sludge sediment levels in the tank.

Another optional accessory is a **device for rakes lifting** to protect the drive system in the presence of very dense sludge or rapidly settling materials.

The flocculant dosage can be controlled with **ERAL's** optional **CONVES** automatic system, which in combination with the flocculant make-up and dosing equipment, maximises thickener tank performance.

FLOCCULANT PREPARATION AND DOSAGE

Effective flocculation and a high sedimentation rate call for **a flocculant make-up and dosing equipment** to automatically control the amount of polyelectrolyte (flocculant) added during continuous operation. This system comprises a hopper for the powdered chemical, a doser with an automatic variator, and preparation, ageing and decanting tanks with their respective electric stirrers. The entire stainless steel assembly features a dosage pump fitted with an electronic speed variator and electrical switchboard.

Flocculant make-up and dosing equipment

Type	Surface m^2	Height mm	Weight (t) Empty	Weight (t) With Load	Drive Motor kW	Feed Capacity m^3/h
T-01	1	1300	0.6	2.1	0.25	4 - 8
T-02	3	1730	1.1	8.1	0.37	16 - 31
T-03	7	2150	3	23	0.55	35 - 71
T-04	13	2530	5	44	0.55	63 - 126
T-05	20	2750	8	74	0.75	98 - 196
T-06	28	3210	10	118	0.75	141 - 283
T-07	38	3490	13	175	1.1	192 - 385
T-08	50	3630	17	232	1.5	251 - 503
T-10	79	4250	23	401	1.5	393 - 785
T-12	113	4520	39	596	1.5	565 - 1131
T-14	154	4350	57	861	2.2	770 - 1539
T-16	201	4470	70	1130	3	1005 - 2011
T-18	254	4880	89	1586	3	1272 - 2545