

# Clarifier Systems



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## Clarifier Systems

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The **Lockertex Clarifier System**® has been designed to reduce the levels of S.S. (suspended solids) and subsequently B.O.D. (biological oxygen demand) in the final effluent produced by sewage and waste water treatment works.

Launched in 1990 as the 'Lockertex Effluent Clarifier System', the systems consist of a unique range of polyester mesh upward flow clarifier screens with the option of automatic cleaning systems.

Installed into hundreds of final settlement tanks to 'polish' the final effluent, Lockertex Clarifier Systems are helping to maintain compliance at sites with consents from 15 p.p.m. S.S. up to 70 p.p.m. S.S., and are increasingly being specified for installation upstream of Sand Filters, SAF, and BAF units etc. to safeguard them from solids overload.

Locker Group Ltd continues to improve the product to maintain its status as a quick and cost effective method for upgrading poorly performing humus tanks, and it now has a stronger framework and options such as algae wash-out sluice gates for problem sites.

### Construction and Installation

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The clarifier screens are made to measure in our workshops for each tank, keeping site installation time to a minimum. The screen panel frames are fabricated from stainless steel box section, around which a twin layer of U.V. stable precision woven synthetic filter mesh is secured complete with integral sealing strips.

They can be retrofitted into most types of final settlement tanks; horizontal end-flow, pyramidal, circular, and radial tanks with rotating half-bridge and scraper arms. The clarifier screens are fastened onto a rigid supporting structure of galvanised mild steel and GRP along with any baffle boards required to direct all outgoing flows up through the screens.

Installation is between 100mm and 350mm below TWL, obstructions such as rodding pipes and valve stems are boxed out with GRP. We provide a full UK installation service, and can remove old clarifier systems such as pebble beds.

### Installation Of Clarifier Screens Into Pyramidal ( Dortmund ) and Radial Tanks

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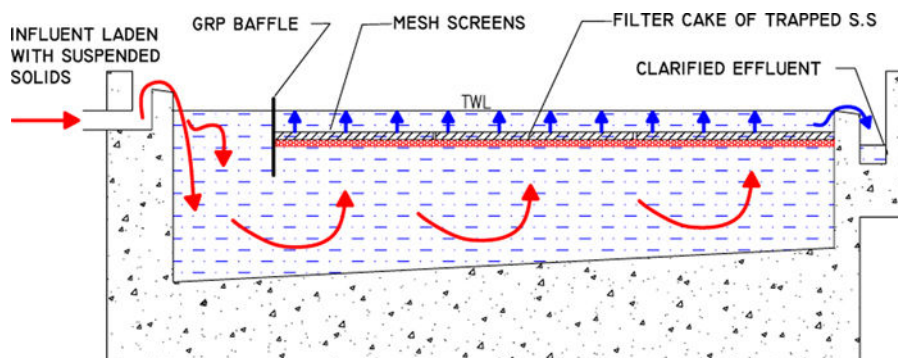


Locker Clarifier Screens have replaced pebble beds at many sites. The synthetic mesh is easier to clean and it is not necessary to walk on the screens, thus improving site safety.

## Clarifier Operation

The Lockertex Clarifier System operates on the principle of cake filtration, with the filter mesh media upon which the cake is formed having a high open area of 61%. This minimises differential pressure and enables the screens to handle higher hydraulic loadings, typically 1.67m<sup>3</sup>/m<sup>2</sup>/hr for end-flow and pyramidal (Dortmund) type tanks, and up to 5m<sup>3</sup>/m<sup>2</sup>/hr for radial tanks fitted with the Locker Auto-Cleaner.

### Horizontal End Flow Tank Schematic



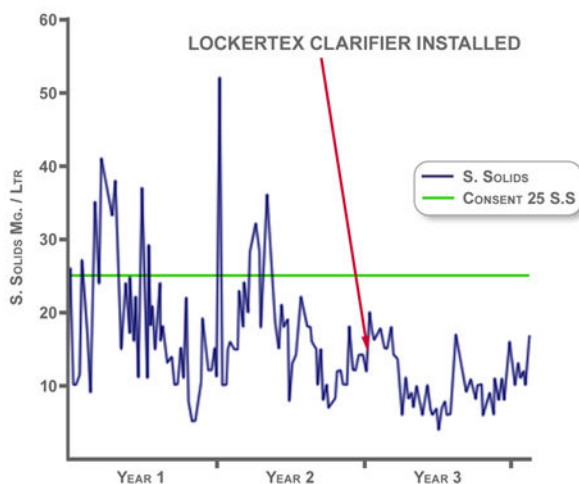
The performance of the settlement tank is improved by the clarifier screens as follows:

- The uniform distribution of the numerous apertures of the precision filter mesh equalises the hydraulic loading over the entire area of the screens, this enhances natural settlement of the larger, denser solids particles and attenuates the effect of up welling currents at the weir.
- The less dense particles of rising suspended solids converge as they approach the apertures of the mesh and flocculate to form a filter cake on the underside of the screen panels. This filter cake retains fine solids which would otherwise be discharged into the weir channel.

### Performance

Installation of upward flow clarifier screens offers a cheaper and quicker solution than most other options to the problems of overloaded or malfunctioning settlement tanks with regard to the carry over of suspended solids. The screens enhance natural settlement, trap rising solids and in hydraulic overload conditions will retain much of the active biomass that would otherwise be swept over the weir.

The Locker Clarifier Systems have been installed at biological waste water treatment works utilising percolating filters and activated sludge processes.



The graph demonstrates the value of Lockertex Clarifiers in reducing peak levels of S.S.

Average results from a trial of a heavily loaded pyramidal tank fitted with Locker Clarifier Screens:

Influent	Effluent	% Removal
144 S.S.	20 S.S.	86

The Lockertex Clarifier Screens have been performing successfully for 17 years at this site.

Humus tank trial Lockertex Clarifier Screens versus Pebble Beds:

Influent	Effluent Lockertex	Effluent Pebble Beds
35.8 S.S. average ( 68 S.S. max. )	4.8 S.S. average ( 14 S.S. max. )	14.9 S.S. average ( 48 S.S. max. )

## Clarifier Cleaning

The filter cake of trapped solids will eventually reach a density sufficient to impair the flow, and for efficient operation of the clarifier screens it is vital that a regular cleaning regime is maintained. The high open area and smooth surface of the mesh simplifies cleaning either manually with a hose pipe or by automated cleaning options.

### Manual Backwashing

This is the usual method employed for horizontal end flow, pyramidal and small circular tanks. It is recommended that the water level is lowered and the screens thoroughly backwashed once per week. Where solids loadings are light this interval can be increased to every 2 weeks.

A 45m<sup>2</sup> tank can be hosed clean in around 20 minutes. Where no suitable wash water supply exists on site, Locker can provide a GRP boxed-out zone in the tank to provide a sump for use with a portable pump cleaning kit.

A 2 ins. pump maximum duty of 600 litres per minute, 29 metres max. head is recommended.



### Locker Auto-Cleaner



This is employed on radial tanks and is mounted on the rotating half-bridge.

On the cleaning cycle the vacuum head is lowered below the water line to be close to the upper surface of the screens, the pump is activated and flocculated solids are sucked up through both layers of mesh and returned as a slurry to the central diffuser box.

The tank remains in operation during cleaning.

The image shows the clarifier screens installed as an annulus complete with a new inner baffle board. The existing scraper leg assembly is modified as necessary.

### Spray Jet Backwash

An automated or semi-automated system of submersible pump and spray jets mounted above the screens is also available for all types of tanks.



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