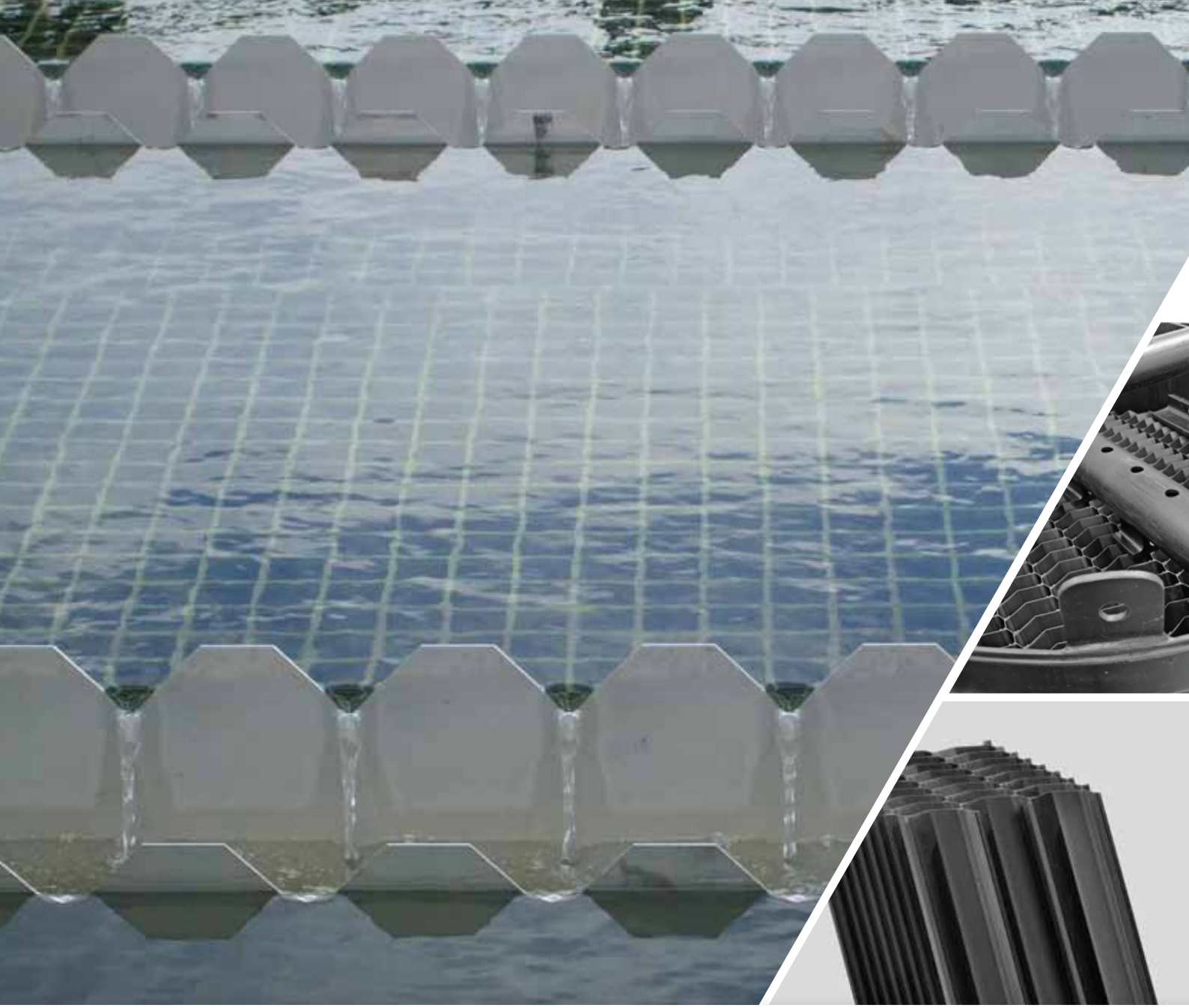


A BUYER'S GUIDE TO POTABLE WATER TREATMENT

How to be sure you're choosing the most effective Settlement and Filtration Lamella Clarification products

ENEXIO
2H WATER TECHNOLOGIES

Effective **potable water treatment** starts with **informed buying** decisions.

That's buying decisions plural because potable water treatment is a **multi-stage process**. To be sure of success, it's imperative you invest in the **most up-to-date and efficient products** purpose built for each stage of the treatment process.

In this guide, we'll take you through the factors you need to consider when assessing products for use in **settlement**, **filtration** and **lamella clarification**.

Why settle for anything less than the long-term benefits –
Process and Financial – Guaranteed by a customised and Cost-effective Solution
built from our TUBEdek range of Lamella Separation Tubular Settlers

POTABLE WATER TREATMENT: *THE BASICS*

There's a potentially confusing variety of types, and combinations, of treatment needed to produce water that meets potable standards for domestic or industrial applications.

What you do – the stages and treatments required, the products used - largely depends on the provenance of the water. That is, whether the original water comes from an underground or surface source

UNDERGROUND

Water that has passed through rock in boreholes will be relatively free from plant and other debris that will hinder the functioning of down-stream systems. The flow can be treated by coagulation and flocculation before being passed through sand filters which leave the liquid free of solid material. At this point, the liquid is ready to be passed through a combination of further treatments which can typically include pesticide removal in a granular activated carbon system, pH control, UV disinfection, chlorination and fluidisation.

SURFACE

Surface water is drawn either from lakes or streams and rivers. Water taken from these sources will carry solid material and vegetation that, if not treated, could block and damage down-stream equipment such as sand filters. To remove material that could cause blockages, the raw water will be screened and chemically treated to ensure coagulation and flocculation before being passed treated for lamella settlement.

The Most Effective Treatment? Lamella Clarification

A Lamella Clarifier or Inclined Plate Settler (IPS) is a type of settler designed to remove particulates from liquids. Unlike conventional Clarifiers they use a series of inclined plates which provide a larger, more effective settling area on a very small footprint.

COMPACT SIZE, INDOOR OPERATION

A lamella clarifier is between 15 and 25% of the size of the non-lamella settlement tank.

Installing lamella clarifiers inside a building means the equipment is protected from wind-blown debris and UV light. It also reduces the potential for algae growth.

COMBINE WITH CHEMICALS, FURTHER IMPROVE TREATMENT

The majority of settlement systems require the pre-treatment of coagulant and flocculent to improve the settlement characteristics for smaller solids. Chemical treatment isn't necessary in systems handling feed with larger, heavier particles.

LAMELLA SETTLERS

Plastic Structured Lamella Settlers

- ✔ Easier especially when compared to stainless steel
- ✔ Lightweight
- ✔ More efficient

Stainless Steel Channel & Bracket System

- ✔ Plate and Bracket system in tank
- ✔ Installing stainless steel plates to act as Lamella Settlers

Stainless Steel Frames to hold modules

- ✔ Modular
- ✔ Drop Sheets into Frame
- ✔ Frame lifted into tank

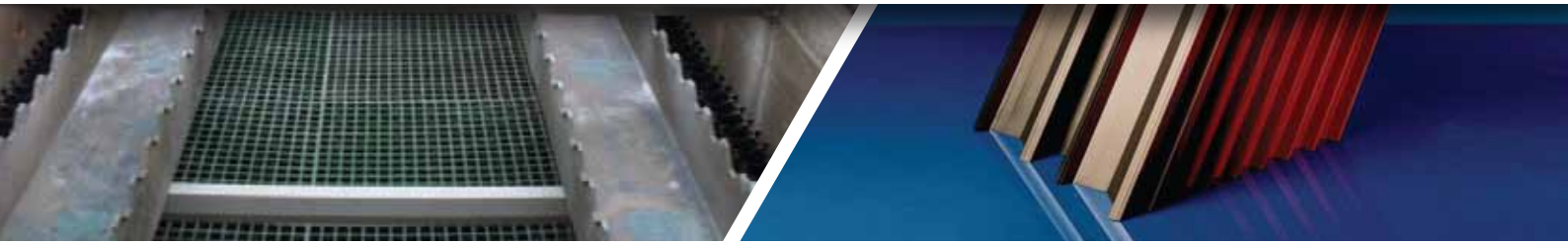
Stainless Steel Access Grid and Anti-float

- ✔ Stainless Steel or plastic

TUBEdek is the answer

The TUBEdek range includes certified lamella settlement tubular settlers suitable for all potable water applications from highland whisky to tap water.

The TUBedek range has been approved to the Drinking Water Inspectorate Regulation 31.



THE TUBEDEK RANGE OF LAMELLA SEPARATION TUBULAR SETTLERS ARE IDEAL FOR USE:

In new potable water treatment installations where sand filters need protection from heavy concentrations of solid are carried into the treatment works.

As a replacement for ageing, underperforming or problematic plant, for example, to replace a horizontal lamella clarifier in which a bottleneck is restricting throughput.

To treat backwash produced by cleaning rapid gravity sand filter instead of the normal multi tank systems.

The combination of Innovative technology, strong yet flexible design & built-in customisation make TUBEdek the most effective lamella settlement solution available today.

PARALLEL PLATE SEDIMENTATION

TUBEdek systems can be created for different angles from 45 to 80 degrees depending on the different requirements between the quality of effluent required and the sludge discharge characteristics of the material being settled. The change of the angle either increases or reduces the square meterage of the settlement area per square meter of the tank plan area.

TUBEdek Lamella Settlement fills utilise a 'V' chevron plate sedimentation profile which is a more effective method of separating solids from liquids.

The 'V' chevron base allows settled solid material to slide to the bottom of the angle and come together creating agglomeration as it runs down the groove in the plate. The top of the tube is the same chevron as the bottom giving a clear exit for the clean water.

In addition, the uniform configuration and inclined angle of the tubes encourages laminar flow for efficient solids separation whilst the 'v' shape encourages the even discharge of the solids to the settlement zone below the TUBEdek modules.

ADAPTABLE TUBES, DESIGNED FOR SUPERIOR PERFORMANCE

The tubes are designed to adapt easily to any process design requirement by varying the inclination, length of tubes and module sizes.

The use of inclined tubes in the TUBEdek system mean that the settlement height of the water within the tube is between 100 and 200mm depending on the distance the plates are apart. This gives a rise rate of around 7 meters per hour.

The upward velocity of the flow that is incurred by only having 20% of the plan area of an open settlement tank is more than mitigated by short distance the solids need to fall before they meet the bottom chevron plate settlement surface in the tube.

Channeling water through individual tubes overcomes one of the problems that occur in flat plate lamellas where more of the flow passes up the central section of the plate rather than the edges.

CUSTOMISED TO YOUR SPECIFICATION

Because every TUBEdek installation is customised to the customer's process and operational requirements, it's guaranteed to be more effective in dealing with heavier loads, higher effluent flows while meeting tighter discharge consents.

The Settlement Process

To understand the reasons why TUBEdek is a faster, more effective and efficient solution, let's first look at what happens during the settlement process.

The short drop to meet the settlement surface means that solids are removed from the water flow quicker than if they have to free-fall through 2 mtr of water before it has settled.

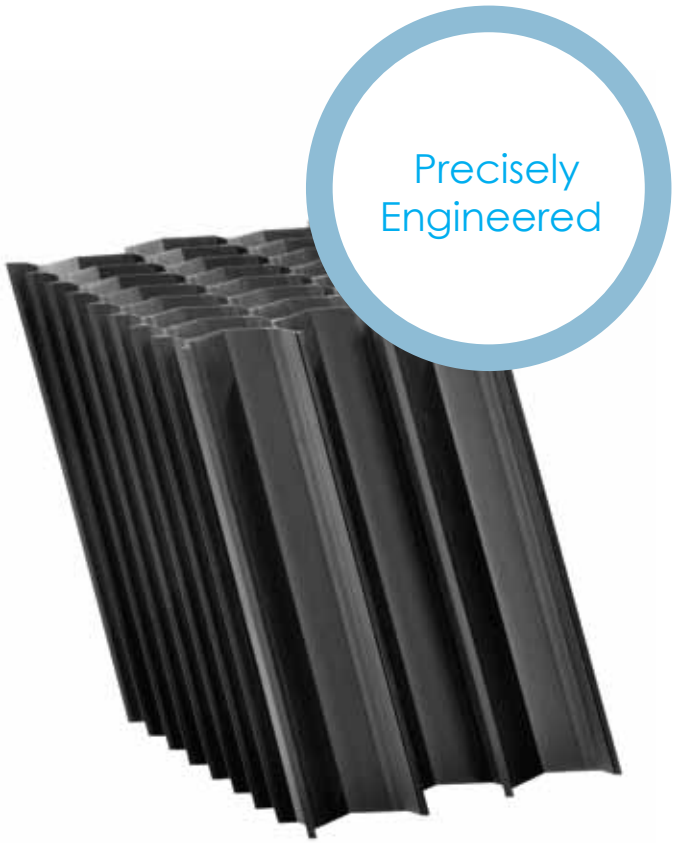
Municipal drinking water treatment typically involves a number of stages and a carefully selected combination of different processes including:

1 *PREFILTRATION:* Prefiltration is a physical process which removes suspended solids. It's important because secondary filtration processes, particularly sand filtration, require low-turbidity influent.

2 *SETTLEMENT:* Also known as Sedimentation or clarification, settlement involves the removal of suspended solids by settling particles moving through a tank at low rate. Adding coagulents and flocculents - also known as polyelectrolytes- to the fluid speeds the settlement process.

3 *FILTRATION:* During the filtration process, particles are removed from the water by passing the flow through a static sand bed, or more commonly, a purpose-designed, washable sand filter.

4 *DISINFECTION:* The flow may be disinfected to kill bacteria, viruses and other pathogens.



The water entering the plant after screening will still contain high concentrations of sand and silt. Efficient chemical treatment collects the solid material into larger flocculated particles which will settle more readily. Used in conjunction a lamella system, chemical treatment reduces the time needed for particles to hit a solid surface and create a sludge.

SAND FILTRATION

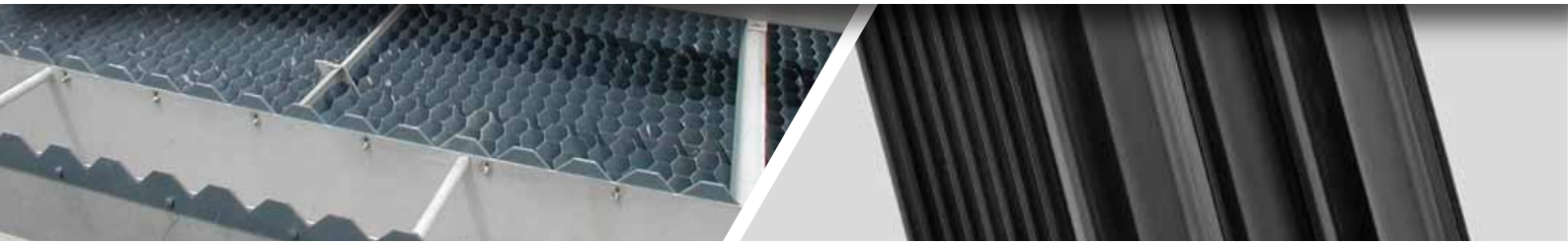
All types of water treatment works use sand filtration systems. The most commonly used sand filters used today are rapid or rapid gravity filters (RGFs). RGFs use relatively coarse sand and other granular media to remove particles and impurities that have been trapped in a **floc** through the use of **flocculation chemicals** - typically alum.

The unfiltered water flows through the filter media under gravity or under pumped pressure and the floc material is trapped in a sand filter.

Lamella Separation: The Basics

Lamellas are inclined parallel plate or tube systems - such as TUBEdek - composed of very shallow basins stacked one on top of the other.

But what is it that makes TUBEdek the most effective lamella settlement solution you can buy?



TUBEdek

TUBEdek is a tubular system which is composed of profiles connected by a tongue and groove principle to form lamella modules which typically are inclined at a 60° angle. Lamellas are inclined parallel plate or tube systems which are essentially very shallow basins stacked one on top of the other.

The tubular system encourages laminar flow which ensures the water passes up through the tubes at a gentle but consistent rate. The short drop to meet the settlement surface means that solids are removed from the water flow quicker than if they have to free-fall through 2 mtr of water before it has settled.

As the particles settle onto the face of the tubes, they're forced into close contact and agglomerate. The process is far faster and more efficient because larger clumps of the agglomerated particles settle out much more quickly than individual particles in standard settlement basins.

TUBEdek offers further advantages over plate systems in that the tubes eliminate crossflow and eddy currents whilst maintaining laminar flow.

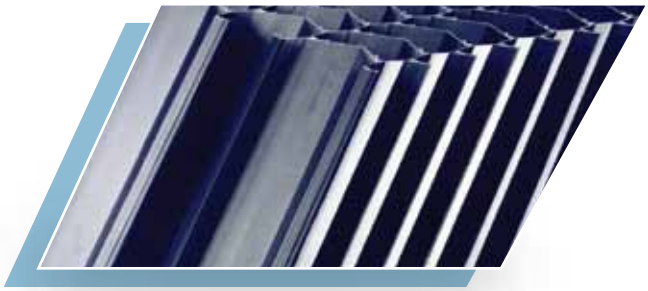
Find out more...

+44 (0)845 0039 114

sales@2hwatertechnologies.com

TUBEdek: Practical & Operational Advantages

A unique combination of innovative technology, strong yet flexible design and built-in customisation capabilities make TUBEdek the most effective method of dealing with heavier loads and higher effluent flows at the same time as meeting tighter discharge consents.



DEALS WITH BACKWASH

Rapid sand filters must be cleaned frequently, often several times a day, by backwashing, which involves reversing the direction of the water and adding compressed air. TUBEdek is an effective method of dealing with the large volume of dirty water with high concentration solids produced by backwashing.

PROTECTS SAND FILTERS, KEEPS SOLIDS CONCERTATION WITHIN LIMITS

Sand filters need protection from the heavy concentrations of solid that are carried into the treatment works from the source water once the floating debris has been removed by screening. TUBEdek media can be used to ensure the water solids concentration is within the limits that can be handled by the sand filters.

Surface water can be polluted by a wide range of contaminants including agricultural, industrial or municipal discharges of nitrogen (ammonia or nitrate). Biological processes – such as nitrification and de-nitrification – are effective in removing this type of pollutant, However, nitrification and denitrification need carriers with surfaces to establish and maintain the biomass. 2H supplies a large variety of such carrier materials including the BCN-range for moving bed or TUBEdek KP319 for structured media reactors.

CHEMICAL FREE, CORROSION RESISTANT

The tube configuration provides greater structural strength allowing the use of corrosion resistant, lightweight PP (polypropylene).

SIMPLE ASSEMBLY, EXCEPTIONAL MECHANICAL STRENGTH

Another unique aspect of TUBEdek is the 'tongue and groove' design which not only makes the system very easy to assemble - a significant bonus for large schemes where TUBEdek modules can be built close or even adjacent to the main site - but also ensures exceptional mechanical strength.

MULTIPLE PLATES, FEWER TANKS

TUBEdek is a more economical solution because it allows for use of multiple sedimentation plates within one tank which reduces the number, size and cost of the tanks required for any installation.

EASY CLEANING AND MAINTENANCE

TUBEdek is easy to clean and maintain either by dropping the water level and pressure washing the modules. Alternatively an automated system can be employed using a coarse bubble aeration system

TUBdek AT-A-GLANCE

- ✓ Rapid gravity sand filter backwash settlement
- ✓ Good for very high water treatment flows
- ✓ Unique tongue and grove assembly construction
- ✓ Equidistant parallel channels give Hazen Velocity calculations
- ✓ TUBEdek support systems have no impact on efficiency Up to 12M2 sedimentation area for each M3 TUBEdek installed
- ✓ Polypropylene material suitable for potable applications
- ✓ Polypropylene not damaged by chemical treatment
- ✓ DWI certified polypropylene material

TUBEdek

The TUBEdek range of Lamella Separation Tubular Settlers comes with a guarantee of more effective potable water treatment than easily blocked horizontal clarifiers and heavier, more expensive plate settlers.

FLEXIBLE, CHEMICAL FREE MANUFACTURING PROCESS

TUBEdek is produced from a neutral polypropylene (PP) material specially formulated for the potable water applications and approved to DWI Schedule 31 standards and other worldwide specifications.

PP is light and easily handled and has the added advantage of being resistant to chemical damage.

TUBEdek can be used to produce units to any size, as large or small as the customer requires.

For larger installation, the tongue-and groove manufacturing approach cuts transport costs by allowing profiles to be shipped to the customer's location for on-site, or local, assembly.

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QUICK AND EASY INSTALLATION

Because it's easy to assemble onsite, TUBEdek can be used to construct plant anywhere in the world. We have reference plants producing several hundred thousand cubic metres of treated water per day operating in countries all over the globe including Uganda, Vietnam and San Salvador.

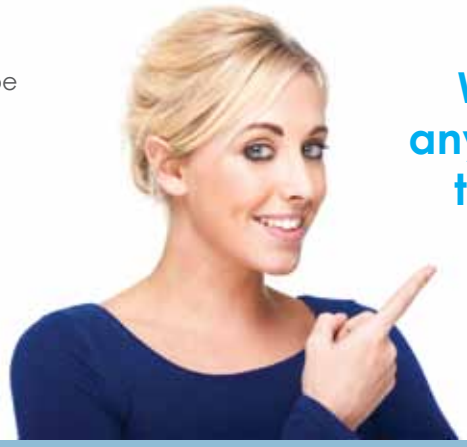
REPLACE, UPDATE, INCREASE CAPACITY: RETRO-FITTING TUBEDEK

TUBEdek can be used to

- Extend the working life – and ROI – of existing assets
- Increase the capacity of existing rectangular or circular non-lamella tanks to handle increased flows and loads
- Replace or update of legacy lamella systems that are underperforming or have mechanical problems

CERTIFICATION

All 2H Water Technologies' products, including TUBEdek, meet UK and International Standards



Why settle for anything less than the long-term benefits

Why settle for anything less than the long-term benefits – process and financial – guaranteed by a customised and cost-effective solution built from our TUBEdek range of Lamella Separation Tubular Settlers?

Find out how 2H Water Technologies can help you improve potable water treatment by calling 0845 0039 114.