

Thickeners and clarifiers

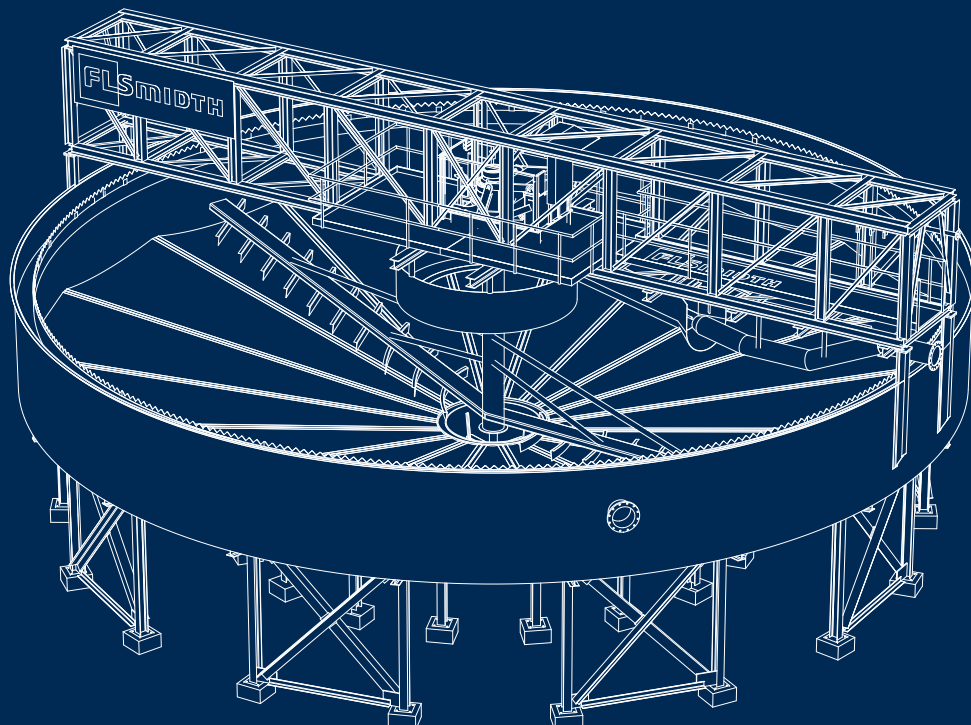
Complete range of reliable and cost-effective solutions



FLS

Your partner in solid-liquid separation

We bring extensive experience to meet your process needs and helps to determine the safest and most cost-effective solution for your application, without compromising quality or dependability.



Operational expertise

Correct thickener and clarifier sizing ensures dependability and efficiency with a margin of safety for process upsets, allowing the greatest operational flexibility. Our experienced engineers are ready to help you with equipment sizing and selection. We will work with you to address your specific process challenges that affect thickener and clarifier selection, including ideal settling rates, retention times required for clarification, and the unit area and solids-retention time required for thickening.

Sizing and specifying a thickener can be challenging. Let our trained experts guide you through the available alternatives and help you select the thickener/clarifier best suited to your process application.

Market-leading technology and productivity

As the market-leading supplier of engineering, equipment and service solutions for the mining industry, we help improve your performance, drive down your costs, and reduce the environmental impact of your operations.

Technology range

Our research and development model integrates continuous evaluation of new technologies and concepts with new and updated product review. Our efforts focus on the development of technical solutions with high performance, reliability and availability; minimum environmental impact; and the lowest possible lifecycle costs. The durable and productive thickening and clarifying equipment offered by FLS are among the most technologically advanced and rigorously tested products available on the market today.

Our comprehensive range of solutions include:

- World's largest and highest capacity bridge and column mounted thickeners
- High-rate and standard thickeners
- High-density thickeners
- Deep cone paste thickeners
- Traction thickeners
- Clarifiers
- Reactor clarifiers
- Lamella clarifiers
- Hydro separators
- Elevated or on-ground tanks

Services, upgrades and retrofits

Sedimentary technology is constantly advancing. Our designers combine years of engineering expertise with major refurbishments, upgrades, and retrofits for existing machinery to ensure ongoing integrity, reliability and productivity. We can evaluate your thickening and clarification needs, and offer upgrades or retrofits, including completely new mechanisms, feed system retrofits and new drives.

Technical services we provide:

- Product review and improvement
- Lifecycle analysis
- Equipment audits
- Process audits
- Testing
- Repairs and refurbishments
- Upgrades
- Original OEM parts
- Retrofits

The complete retrofit and upgrade packages we provide are unique in the industry, as they typically include design, engineering, fabrication, planning, scheduling, project management, installation and commissioning.



High-rate thickeners

In developing our high-rate thickeners, we draw upon decades of experience in flocculation, feed dilution, and sedimentation technology from EIMCO® and Dorr-Oliver®. We work with you to address your specific process challenges that affect your thickener and clarifier selection.

High-rate thickeners

High-rate thickeners are designed to provide roughly 12 times the throughput of conventional machines of similar size. The key features for high-capacity thickeners are the feedwell design and the feed slurry dilution method. Our patented E-Volute™ feedwell offers Computational Fluid Dynamics (CFD)- optimised energy dissipation and solids distribution. E-DUC® and P-DUC feed-dilution systems maximise flocculation efficiency and settling rates.

Benefits include:

- Maximum capacity
- Improved control
- Increased underflow density
- Lower flocculant dose
- Better slimes management
- Improved overflow clarity

Bridge-supported and column-supported thickeners

EIMCO and Dorr-Oliver thickeners are available in both bridge-supported and column-supported designs. We offer beam- or truss-type bridges, depending on thickener diameter. In the bridge-supported design, suitable for thickeners up to 50 m in diameter, the drive is supported by the bridge, driving the rakes with a centre shaft.

Column-supported design drives are supported by a stationary centre column of steel or concrete, and are practical for thickeners up to 135 m in diameter. The centre column supports the drive, rake cage and rake mechanisms, while the truss bridge, extending from the centre pier to the tank periphery, supports the walkway and feed system.

Optional lifting devices for either design offer additional operational flexibility.

Standard thickeners

Standard bridge-supported high-rate thickener designs are available for accelerated delivery, and include either welded or bolted elevated steel tank designs up to 40 m in diameter and are ideal for many applications.

Traction thickeners

Typically installed in concrete tanks, traction thickeners have a stationary centre pier which supports the rake mechanism central bearing about which the rake arms rotate. The centre pier also supports the rotating feedwell and partially supports the rake mechanism and access bridge. The bridge supports the feed pipe or feed open launder. At the tank perimeter, the full-radius rake arm is supported on and driven by the drive unit (tractor). The drive unit runs steel traction wheels on a steel rail at the edge of the tank. Under appropriate climatic conditions, traction thickeners are an efficient, cost-effective design.

Thickener tanks

Tank options include in-ground, on-ground, anchor channel or elevated steel. Steel tanks are available as welded or bolted designs.



Traction thickeners on a tailings duty

Paste/high-density thickeners, ultra-high-rate clarifier-thickeners

With more installations in more applications than all of our competitors combined, we are the world leader in deep cone paste thickening and high-density thickening technology.

Deep Cone® paste thickeners for ultimate underflow solids concentrations

EIMCO Deep Cone paste thickeners produce underflows concentrated to near their limit of pumpability. The deep tank design maximises pulp concentration, and produces uniform, non-segregating underflow slurry with a paste consistency.

E-Cat® ultra-high-rate clarifier and thickener

With its rakeless design, the E-Cat uses novel technology to accomplish both clarification and thickening in a single unit that takes up minimal area.

The design advantages include:

- Low capital cost compared to conventional thickeners
- Low maintenance costs due to no moving parts
- Much smaller area required compared to conventional thickeners
- Low operating costs, low flocculant consumption

High-density thickeners

By adding depth and torque to a high-rate design, high-density thickeners improve underflow densities at a substantially lower cost than deep cone thickeners.



Deep Cone paste thickener

Clarifiers

We are here to help you with all your solid-liquid separation needs. Your goals are our goals – ease of operation, increased capacity and better performance.

Clarifiers

When overflow clarity is of utmost importance, turn to us to deliver a design that will handle your application and flow requirements.

Available clarifier features include:

- Surface skimmers
- Froth baffles
- Low-shear turbines
- Internal or external solids recirculation
- Paddle flocculators
- Various feed pipe arrangements
- Various effluent launder arrangements

Feedwell alternatives include energy-dissipating or mechanically mixed flocculation and solids-contact reaction wells. We can design effluent launder configurations for equalised flow distribution, liquor storage, optimised hydraulic loading, and descaling access.

Inclined plate clarifiers

Inclined plate clarifiers maximise the clarifier's settling area while minimising the tank footprint. In order to increase the clarification area of conventional clarifiers, We offer inclined plate clarifiers for a range of tank sizes. These inclined plates are constructed in rectangular packs that operate on the same settling principles as the Delta-Stak® clarifier.

Adding plate packs to a conventional clarifier increases the clarification area 4-6 fold. The plate packs can be equipped with a optional winch to allow the plates to be lowered to the vertical position allowing solids to slough off the plates. The inclined plate clarifier retains the raking feature of a conventional clarifier.



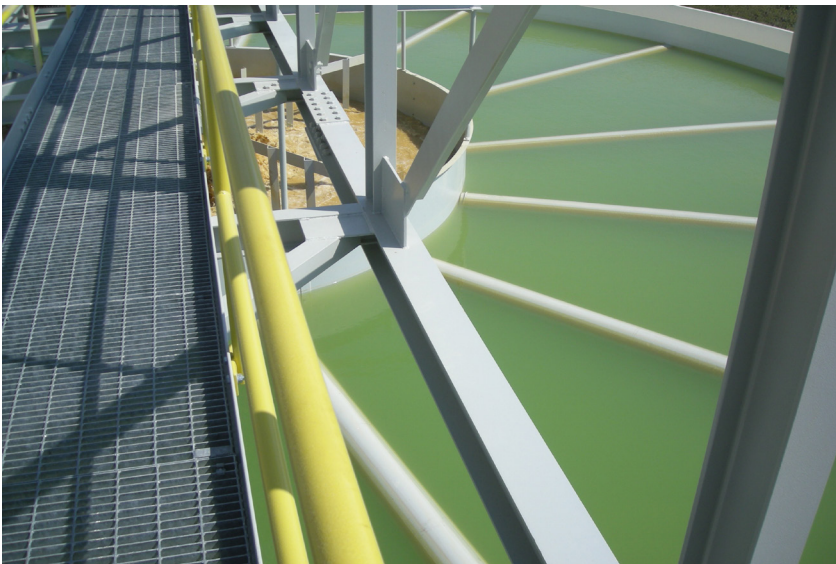
An FLS clarifier providing amazing overflow clarity

Reactor-Clarifier™ solids-contact unit

EIMCO Reactor-Clarifiers offer optimal flocculation, solids contact and precipitation. Dual concentric rake and turbine drives provide solids raking, along with low shear pumping and mixing.

Delta-Stak clarifiers

EIMCO Delta-Stak clarifiers combine the simplicity of gravity settling with inclined-plate sedimentation principles. Our patented design reduces space requirements and costs, while providing operational simplicity and high overflow rates.



Reactor-Clarifier

Solids-contact clarifier with radial supernatant collection launders.

Clarifier mechanism

A large diameter, column-supported clarifier mechanism.

Clarifiers are available in both bridge-supported and column-supported designs.



Feedwell technology, feed dilution systems

Using feedback and suggestions from you – our partners in the field – our experts are constantly working to implement continuous improvements for thickener and clarifier designs.

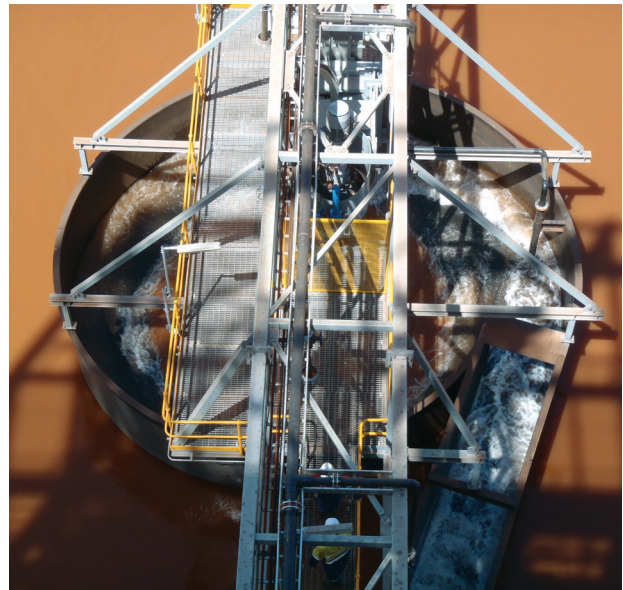
E-Volute™

The EIMCO E-Volute feedwell is our latest evolution of feedwell design. With its patent-pending, advanced involute design, E-Volute evenly distributes feed within the thickener and minimises flocculant shearing. The tapering shelf and sloped inner shelf promote superior feed stream energy dissipation, optimal mixing energy and improved shear profiles to ensure thickener performance and efficiency.

Our E-Volute feedwell technology incorporates the EIMCO E-DUC® feed dilution system, which uses feed stream momentum to induce large volumes of feed dilution prior to the feedwell – promoting an improved mixing profile and increased residence time. The result is fully optimised flocculation, increased settling rates for better overall performance, dramatic cost savings and greater profitability.

Benefits include:

- Increased retention time in the feedwell
- Maximised solids throughput
- Reduced shear rates and minimised flocculant consumption
- Increased flocculation efficiency
- Even distribution of feed slurry/solids
- Enhanced settling rates and increased equipment capacity
- Optimised underflow solids
- Minimised short circuiting
- Reduced overflow solids



E-Volute spiral results in excellent flocculation and distribution



P-Duc and E-Volute feedwell

Advantages of E-Volute feedwell and E-DUC feed dilution technology:

- The system implements full dilution of the feed slurry prior to entry into the feedwell.
- The feed system design separates the feed system dilution function from the energy dissipation function.
- A high degree of mixing energy prior to the feedwell entry mixes solids, dilution water and flocculant, and promotes optimum flocculation conditions in the mix channel.
- Patent-pending involute design spins the feed stream, yet reduces turbulence, for improved mixing and flocculation
- The low turbulence and further flocculation within the E-Volute feedwell provides the optimal environment for flocculation and aggregate growth – minimising flocculant requirements and increasing settling rates.
- Installation of a shelf located just below the bottom of the mix channel minimises short circuiting in the feedwell.
- The open feedwell exit provides a large surface area for aggregate throughput, reducing velocities and turbulence as the slurry exits the feedwell, minimising the aggregate breakage that can occur in the closed-bottom feedwells.
- Reduced shear-induced breakage increases settling rates, improves clarity and maximises density.
- By maximising aggregate size with minimal flocculant, the system improves compaction in the mud bed and increases underflow density.

P-DUC pumped feed dilution system

In applications where the thickener feed stream is expected to experience wide variations in flow or weight percent solids content, the EIMCO P-DUC feed dilution system can ensure consistent, optimal dilution level, as well as maintenance of acceptable pipeline velocities and shear rates. The P-DUC design incorporates variable-speed-drive, axial-flow impellers that optimise feed dilution over an extremely wide range of feed flows and process conditions, to precisely deliver the correct amount of liquid for ideal feedwell flocculation conditions.

Drive heads

We understand your process flow, and the role sedimentation plays as a key component of your overall operation. With our worldwide-standard-setting drives, your thickeners and clarifiers will enjoy long service life, low maintenance, and excellent reliability.

Drives and lifts

Our extensive experience in gear design and manufacturing combines leading technology with computerised parametric data to produce a complete line of application-engineered drive heads. We have drives with torques ranging up to 13,000,000 Nm – enough to meet almost any process requirement. Our drives are available using either electric or hydraulic motors.

We maintain complete control over the quality, materials and manufacture of our drive heads.

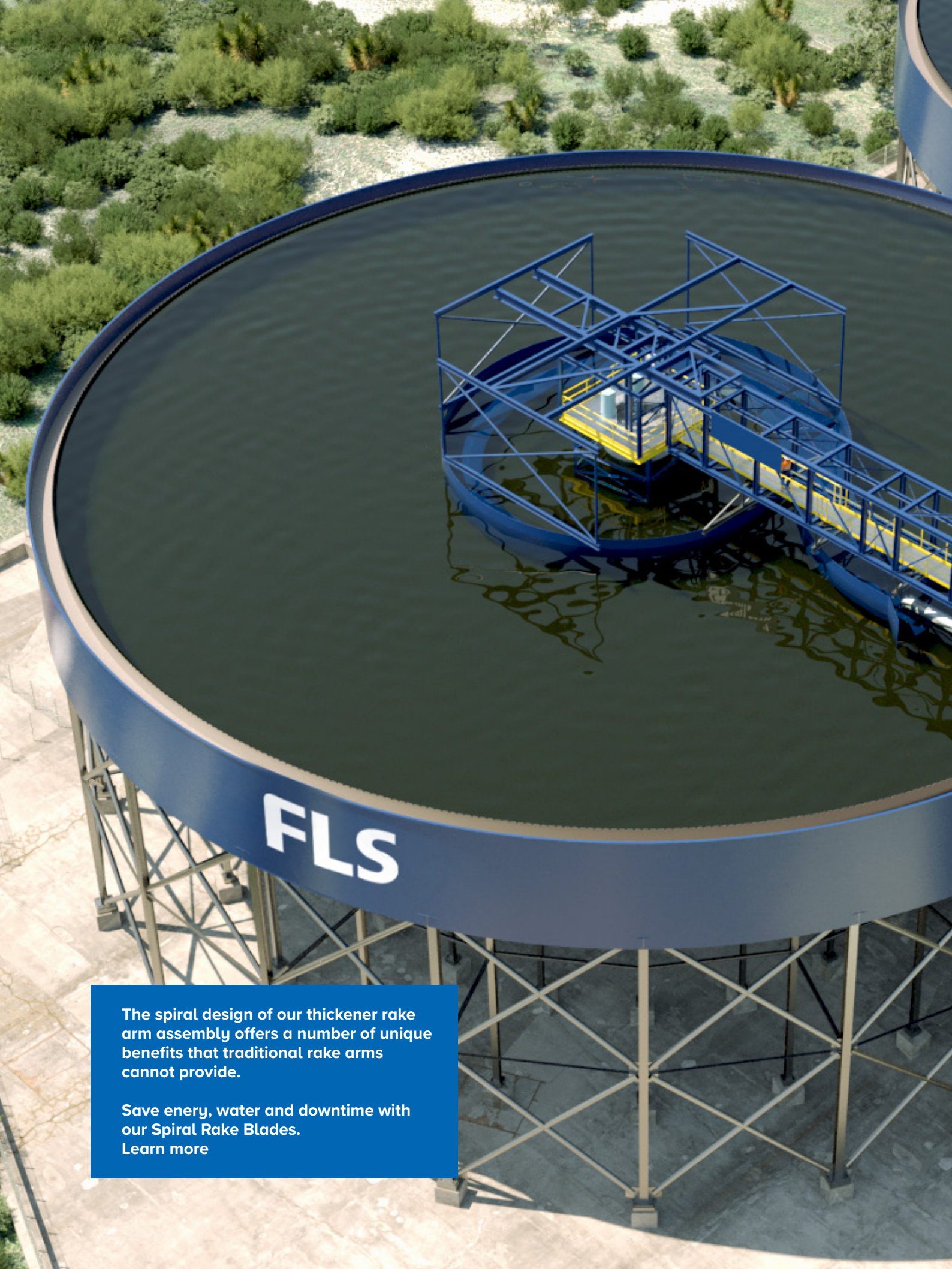
Superior design of our machines ensures:

- High output torque
- Maximum service life
- Support for the mechanism and its operating loads
- Reliable overload protection
- Allowance for lift capability

For our standard thickener range, we also offer our proprietary LinkLift drive, with a high-efficiency planetary gearbox.



FLS high-rate thickener prior to being commissioned



FLS

The spiral design of our thickener rake arm assembly offers a number of unique benefits that traditional rake arms cannot provide.

Save energy, water and downtime with our Spiral Rake Blades.
[Learn more](#)

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