



**KUSTERS WATER**

a division of KUSTERS ZIMA

# Clarifiers & Thickeners

HEADWORKS

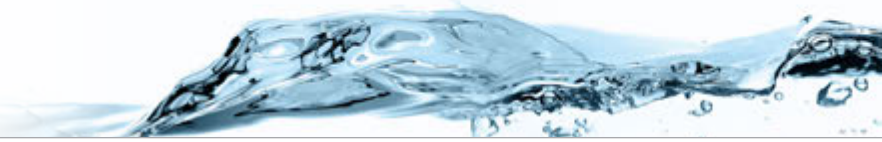
BIOLOGICAL

CLARIFICATION

THICKENING

BIOSOLIDS

# Clarifiers & Thickeners



## QUALITY, EXPERIENCE AND RELIABILITY

*Kusters Water is an industry leader in all types of clarification and thickening equipment for water and wastewater treatment. Our products are in operation at hundreds of facilities around the world and are utilized daily for primary, secondary, and final clarification processes, as well as sludge thickening. Our innovative technologies, superior designs, and in-house drive manufacturing result in a superior product for our customers. Our team is ready to assist you with new equipment designs, optimization retrofits, and/or upgrades.*

## BRIDGE SUPPORTED UNITS

Bridge supported clarifiers and thickeners are offered in sizes ranging from 5' to 80' in diameter. Primary, secondary, and final clarification are typical applications. Every unit includes a worm, planetary, helical or spur gear drive unit designed in accordance with current AGMA or ISO standards to ensure the absolute highest quality and a minimum 20-year service life. Small diameter "shop built" units are offered in sizes up to 12 feet in diameter. Each unit is test-fit, then shipped to the customer partially assembled to reduce installation time and costs. Components typically include: steel tank shell, inlet and outlet nozzles, collector mechanism, effluent collection trough with weir and baffle plates, scum skimmers, feedwell access bridge with decking and handrail, and all required appurtenances.



## PIER SUPPORTED UNITS

Pier supported scraper clarifiers and thickeners are designed for all applications involving sludge removal and thickening. Flow enters through the center pier then discharges through four outlet ports located at the top of the center column of the basin and into either a controlled energy dissipating inlet (EDI) well or feedwell. The energy dissipating inlet / feedwell dissipates the influent energy, minimizes density currents, and enhances settling. Solids are collected at the bottom of the basin and raked to a collection sump located in the tank floor. The clarified effluent exits over the weir plates and out of the basin.



### ***Spiral Blade Clarifier Systems***

Spiral blade clarifiers are commonly used in primary and secondary clarification. The logarithmic spiral curve and deep blades provide a more effective means of sludge transport. Variable rotational speeds are recommended to allow for optimizing sludge removal and overall clarifier performance. Multiple accessories can be incorporated into the clarifier including: density current baffles, (EDI) energy inlets, full surface skimmers, ducking skimmers, FRP feedwells, and sludge collection manifolds.



## RAPID SLUDGE REMOVAL CLARIFIERS

Rapid sludge removal clarifiers are specifically designed to provide quick and uniform removal of return activated sludge (RAS). Two suction styles are available.

### *Suction Pipe*

Model HBSL collectors utilize collection pipes located at multiple points along each clarifier arm. Suction is generated by a differential in head developed from the partially submerged return sludge well located at the center of the clarifier. Each collection pipe is equipped with a return flow variator that controls the rate of sludge return and provides a visual indicator of the quality of RAS. Every pipe discharges into the rotating central return sludge well, then by gravity exits through a vertical steel pipe located inside the center pier. The size and quantity of pipes are selected according to the RAS flow rates. Rotating trough, straight tube designs are also available, model HBSL-S.



Model HBSL



Model HBSL-S



Model HBMS  
(Single Header)

### *Suction Header*

Model HBMS collectors utilize a rotating tapered sludge collection header and manifold assembly to remove activated sludge. Settled solids are collected through orifices located along the full length of the header. Varying orifice size and spacing are computer generated to provide the desired velocities throughout the entire header assembly. Suction is typically provided by direct connection of the return activated sludge pumps to a central draw-off manifold at the tank bottom. An optional rake arm opposite the sludge header is available to collect any remaining solids. Sludge headers are offered in either single or dual configurations.



Model HBMS (Dual Header)

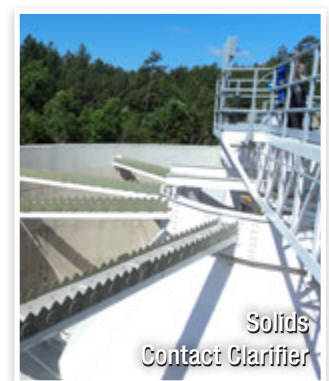


Model BSRC

## HIGH PERFORMANCE CLARIFIERS

### *Solids Contact Clarifier Systems*

Solids contact clarifiers are designed for use in water treatment applications, including: Turbidity removal, lime softening, and iron and color removal. Every unit includes an axial flow recirculation mixer constructed of stainless steel for long life and no maintenance. The mixer drive and rake drive are independent of one another allowing for simple and individual service. Sizes are available up to 200 feet in diameter.



Solids  
Contact Clarifier



Model HBFC

### *Flocculation – Clarifier Systems*

Flocculating clarifiers are particularly effective for flocculation and clarification of municipal and industrial water supplies, screened primary sewage, wastes with high grit content, and industrial wastewater containing heavy settleable solids. Flocculating units can also be adapted to tertiary waste treatment as well as potable water coagulation. Individual flocculators or concentric turntable style flocculators are available. Properly sized paddle area and accurately computed velocity gradients ensure optimum performance.

# Clarifiers & Thickeners



## CLARIFIER AND THICKENER DRIVES

All Kusters Water clarifier and thickener drives are manufactured in-house at our Spartanburg, SC facility. Kusters Water offers the largest selection of drives in the industry, including: Cast Iron split gear drives, fabricated steel precision bearing drives, high torque lift drives, hydraulic drives, helical drives, planetary drives and worm gear drives. Our team is ready to assist you with the proper drive selection based on your application and preferences.

### **Concentric Drives Units**

Concentric drives are commonly utilized in solids contact or flocculating clarifier applications. Each unit includes an independent rake drive and flocculator or turbine drive. Housings are offered in either cast iron or steel. Variable speed drives are utilized on the flocculator and turbine drives to allow for better control of velocity gradients in the flocculation zone. Styles include both Bridge Mounted and Pier Mounted units. All units can be equipped with worm, cycloidal, helical or planetary gear reducers.

### **Lift Drives Units**

Lift drives are utilized in high torque applications. The standard unit is equipped with an electric or manual lift assembly that raises and lowers the drive shaft and rakes. Commonly used in mining, aggregate and thickening applications.

### **Hydraulic Powered Drive Units**

Technically advanced, hydraulic powered Type H drives are available in wide range of operating torques and output speeds. Power is introduced through a standard "C-Face" mounted motor connected to a low speed, high torque hydraulic power system with integral valves, pump, hydraulic motor, filter and appurtenances fully enclosed in a 304 stainless steel housing/oil reservoir.

#### **Overload Protection:**

Precise torque monitoring is a major advantage of the Type H drive system. The overload system includes alarm and motor cut-off switches that are activated by an increase in operating pressure in the hydraulic system that is directly proportionate to the torque load on the rotating mechanism. Each unit includes a maximum torque pressure relief valve, which takes the place of less accurate mechanical shear pins and allows the unit to gradually stall without damage to the rotating mechanism. Torque is monitored via a 6-inch liquid filled gauge that reads in actual operating torque.

#### **Major Advantages of Hydraulic Drives:**

- Gauge Readings in Actual (Ft-lbf) or (N\*m)
- 304 Stainless Steel Housings
- External Oil Filter with Replacement Gauge
- Accurate Liquid Filled Torque Gauge
- Max torque Pressure Relief Valve
- Directional Valve
- 4-20mA Output for Remote Monitoring



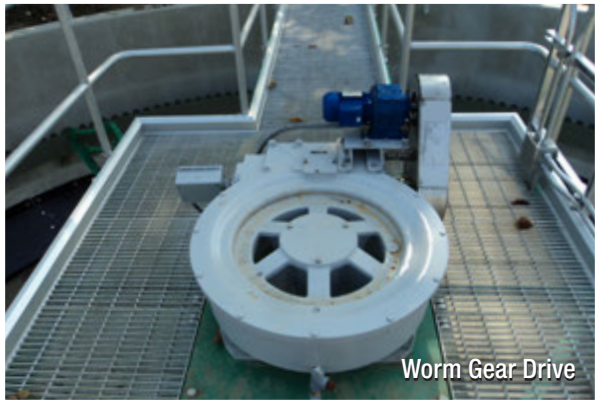
Concentric Drives



Rake Lift Drives



Hydraulic Drive



Worm Gear Drive

### **Bridge Mounted Drive Units**

#### **Worm Gear Drives:**

Centrifugally cast bronze or ductile iron worm gear drives enclosed in ASTM A-48, Class 40 cast iron housings offer superior corrosion resistance and exceptionally long service life. Worm gear units are offered in many standard sizes up to a 30" main gear pitch diameter. Commonly used in municipal and industrial clarifier/thickener applications.

#### **Spur Gear Drives:**

External tooth spur gear drives enclosed in ASTM A-36 fabricated steel housing are available in numerous sizes up to an 80" main gear pitch diameter. Every unit can be equipped with worm, helical, planetary or cycloidal gear reducers. The precision main gear/bearing design is excellent for high torque applications.

#### **Major Advantages:**

- Cast Iron or Steel Housings
- Condensate Removal System
- B-10 Life Rating in Excess of 200,000hrs
- Strip Liner or Precision Bearings
- Ductile Iron or Steel Gears



Spur Gear Drive

### **Pier Mounted Drive Units**

#### **Fabricated Steel Drives:**

Internal tooth spur gear drives enclosed in Fabricated Steel housings are offered in numerous standard sizes up to 120" main gear pitch diameter. For use in municipal and industrial clarifiers and thickeners. Every unit can be equipped with worm, helical, planetary or cycloidal gear reducers.

#### **Major Advantages of Steel Drives:**

- Precision Bearing Design
- High Strength A-36 Steel Housings
- B-10 life rating in excess of 200,000hrs
- Contoured Raceway Design
- Condensate Removal System
- Induction Hardened Steel Main Gears
- Oil Lubrication

#### **Cast Iron Drives:**

Internal tooth spur gear drives enclosed in ASTM A-48, Class 40. Cast Iron housings are offered in 5 standard sizes: 30", 42", 60", 80" & 100" main gear pitch diameters. For use in municipal and industrial clarifiers and thickeners. Every unit can be equipped with worm, helical, planetary or cycloidal gear reducers.

#### **Major Advantages of Cast Iron Drives:**

- Split Main Gear Design
- Corrosion Resistant Cast Iron Housings
- Replaceable Strip Liners
- Replaceable Ball Bearings
- Exceptionally Deep Oil Reservoirs
- Condensate Removal System
- Ductile Iron or Cast Steel Main Gears



Pier Mounted Unit

# Clarifiers & Thickeners



## SPECIALTY ITEMS FOR YOUR KUSTERS WATER CLARIFIERS AND THICKENERS

### *Density Currents Baffles*

A common problem experienced with clarifiers is solids exiting over the effluent weir. Kusters Water offers a density current baffling system in the clarifier basin to help minimize density currents and short-circuiting of suspended solids. Baffle designs are available in a variety of configurations, including: FRP baffles that bolt to the tank periphery, or the baffle can be incorporated as an integral part of the effluent launder and concrete basin.

### *Energy Dissipating Inlets (EDI)*

Correct feedwell design is important in all clarifiers, particularly in large collectors, or during peak flow conditions. Properly designed feedwells promote uniform, radial displacement of flow through the sedimentation tank. When hydraulic displacement is not uniform, short-circuiting and poor settleable solids removal results. The purpose of this dual chamber feedwell is to maximize the influent energy. The inner energy dissipating inlet (EDI) has a full bottom, and the cylindrical side wall or bottom is equipped with multiple outlet ports. As the flow passes to the outer flocculation feedwell, the outlet ports induce a low-grade flocculation, and transport homogenized mixed liquor into the basin with greatly reduced currents. EDI designs offered include: LA-EDI, gated EDI, Scooped EDI and MEDIC.

### *Specialty Items Include:*

Drive Platforms	Galvanized Coatings	Rake Lift Mechanisms	FRP Feedwells
Full Radius Scum Box	Scum Spray Systems	LA-EDI Inlets	UL-Controls
Steel Tanks	Ducking Skimmers	Effluent Troughs	Stainless Steel Construction





Rake Lift Mechanisms



Scum Spray System



UL-Controls



Steel Tanks



Effluent Troughs



Full Radius Scum Box



Drive Platforms



FRP Feedwell



Dependable, cost-effective solutions  
for water and wastewater treatment.

For more information call **864.576.0660**  
or visit **[kusterswater.com](http://kusterswater.com)**



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