

# Parkson Water Research Facility

There is no better way of ensuring a system can perform for your specific needs than to test treatability in lab and pilot studies. Our commitment to maximizing your ROI demands that testing studies and early identification of the most effective process solutions be conducted efficiently and quickly.

Our engineered solutions have been utilized to reclaim water and other valuable process resources, reduce plant operating costs, expand plant production capacity, and assist with regulatory and compliance issues. Parkson's approach is to work closely with each customer to identify potential solutions. This is accomplished by evaluating various technologies, developing innovative and customer-specific treatment approaches, demonstrating and quantifying technologies, reviewing associated value, and recommending full-scale system options.

Parkson's engineers focus on development of new products, improvement of existing products, and application of existing products to new markets or uses.

The Water Research Facility (WRF) makes it possible for Parkson to conduct a wide variety of research and development work. The WRF houses a 65,000-gallon test tank (12' wide x 24' long x 32' deep) predominantly utilized for Standard Oxygen Transfer Efficiency (SOTE) testing, a chiller for maintaining water temperature during testing, and a variety of blower options. All of Parkson's pilot units are stored, maintained and managed at the WRF.

Parkson also has an analytical laboratory that is used for water/wastewater characterization and initial product sizing. Additional work carried out at the WRF includes product lifecycle testing, performance testing, and prototype development and validation.

## Laboratory Testing

Parkson's Water Research Facility uses laboratory testing to help determine design criteria and sizing for Parkson products and facilitate performance guarantees. Our experienced engineers can recommend the best possible solution based on treatability tests where representative samples of your process stream are analyzed. Some tests include filtration tests, jar tests (settling and dewatering), screen selection bench tests, treatability tests, and analysis such as total solids, total suspended solids, volatile solids, turbidity, alkalinity, pH, and material composition. Laboratory tests help our service group with start-up performance testing and help pilots with a base for chemical pre-treatment optimization.

Customers are provided with a detailed test report that includes:

- Test methodology used
- Findings
- Results and recommendations
- Preliminary sizing of full-scale equipment



Based on the lab report, pilot testing onsite may be recommended. If no pilot testing is necessary,

our team of experienced engineers will provide a preliminary full-scale design including layout, budget estimate, ROI, and process flow diagram.

## Pilot Testing

Parkson owns a fleet of pilot equipment available for demonstration. Onsite pilot testing allows you to become better acquainted with the product technology, its operation, and how effectively plant requirements will be met. Pilot units also allow for the comparison of different technologies for water and wastewater treatment within your plant. This real time testing will confirm applicability of our treatment processes and help generate an effluent quality to meet or exceed customer requirements. Parkson pilots facilitate information on the removal efficiencies and volumetric loadings of a given wastewater. Our fully equipped lab will provide any necessary pre-pilot testing of wastewater samples to further define pilot study goals.

We can bring the testing directly to you with our skid-mounted pilots. Our pilot rental units are complete systems designed to allow for testing of all relevant parameters applicable to a given process-based requirement. Rental units are equipped with all the necessary instrumentation and controls for operation. Pilots tests can run anywhere from a few weeks to several months depending on customer requirements and agreed upon test protocol.

At conclusion of the pilot, customers are provided a detailed test report, including recommended technology selection and expected performance. These reports, which are conducted by experienced field personnel, help Parkson to evaluate alternatives and determine economical and effective solutions. Upon successful completion of the testing, a full-scale system can be designed based on the operating conditions and insight gained through pilot system operation. Our team of engineers will provide the details of full-scale design including layout, budget estimate, ROI, and process flow diagram.

# WRF Laboratory Analysis

The Water Research Facility (WRF) conducts raw water and wastewater treatment analysis. We analyze the samples in order to characterize constituents which dictate treatment needs. The lab follows testing procedures as detailed in "Standard Methods for the Examination of Water and Wastewater."

## Analytical Equipment Utilized

- Hach reagents, colorimeters, spectrophotometers, digestors
- Lab ovens, bench top gang stirrers, vacuum apparatus, crucibles, precision balances

## WRF Lab Analytical Capabilities

- Total solids
- Total suspended solids
- Fixed and volatile solids
- Specific gravity
- pH
- Turbidity
- Total and reactive phosphorus (orthophosphate)
- Silt density index
- Total and free chlorine
- Alkalinity
- Fluoride
- Total iron
- Low resolution manganese
- High range silica
- Total organic carbon



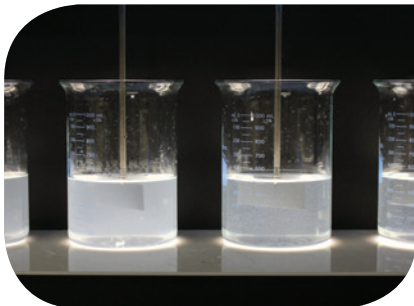
## ThickTech™ Rotary Drum Thickener Analysis

### Effective chemical treatment to flocculate and thicken sludge sample

- Jar tests using cationic, non-ionic and anionic polymers
- Filtration tests to optimize polymer type and dosage

### General performance specifications

- Inlet flow: 0.5% - 1.5% solids
- Outlet flow: 5% - 8% solids
- Typical polymer usage: 5-10 lbs (100% active content) / ton of sludge (dry wt.)
- Solids capture: 98%



## Lamella® Gravity Settler (LGS) / Lamella Gravity Settler Thickener (LGST) Analysis

### Effective chemical treatment to flocculate and settle solids

- Jar tests using various coagulants and polymers
- Settling tests to optimize chemical treatments and size equipment
- Effluent quality and underflow solids concentrations are estimated
- Project performance based on polymer



## Plate and Frame Filter Press Analysis

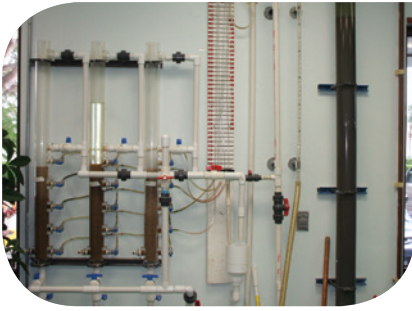
### Filtration cloth and precoat analysis

- Filter press tests with a range of filter cloths
- Tests with precoat materials to enhance filtration characteristics of chosen cloth
- Varying press chamber tests for proper equipment sizing

### Effective chemical treatment to flocculate solids for dewatering

- Jar tests using various coagulants and polymers performed as needed
- Filter press tests to optimize chemical selection and dosages





## DynaSand® Analysis

### Effective chemical treatment to precipitate solids for filtration

- Jar tests using various coagulants
- Syringe filters used to ensure target analytes can be filtered out

### Sand column tests to confirm proper filter configuration

- Single or dual stage analyses options available
- Standard or deep bed configurations
- Confirmation of appropriate flow rate to size filters
- Various media sizes and types available to test

### Nutrient removal applications

- Phosphorus and nitrogen removal test
- Effluent analyte concentrations tested onsite with Hach colorimeters and spectrophotometers; Confirmed via third-party labs



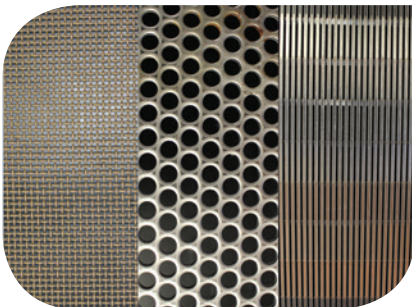
## Sand Sieve Analysis

### Sieve shaker test confirms sand media sample specifications

- Sieves used based on expected specifications
- Determines effective size and uniformity coefficient
- Able to confirm if sample meets one of Parkson's available specifications

### Acid solubility test

- Determines extent of sand contamination with undesirable foreign particles



## Screenings Products Lab Analysis

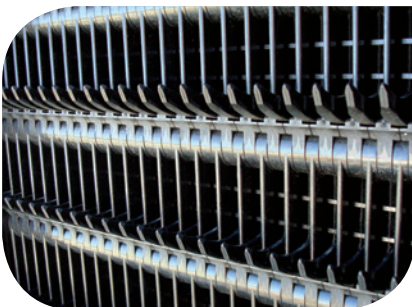
**Screen analysis is tailored to the selected equipment:** Hycor® Rotoshear®, Hycor® Rotomesh®, Hycor® Rotostrainer®, Hycor® Hydroscreen™

### Analysis of screen types and sizes

- Varying sizes of each screen type are available to test
  - » Woven wire
  - » Perforated plate
  - » Wedge wire

### Analysis of solids removal and blinding potential

- Percent of solids screened and filtrate quality are determined for each screen tested
- Screens are observed for potential screen blinding and lodging of solids
- Chemical treatment investigated for appropriate applications



## Aqua Guard® Lab Analysis

### Analysis of screen types and sizes

- Sizes of each screen type available
  - » Aqua Guard® Element – 1mm
  - » Aqua Guard® Perforated Plate – 3mm and 6mm

### Analysis of solids removal and blinding potential

- Percent of solids screened and filtrate quality are determined for each screen tested
- Screens are observed for potential screen blinding and lodging of solids

# Pilot Units



## Hycor® Rotoshear® EZ-Care™ and Rotomesh® PF

### Internally-Fed Rotating Screens

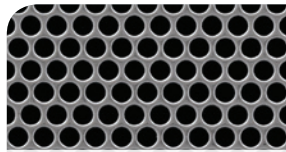
- HRS 3648DV EZ-Care
- Self-cleaning rotary drum screen
- Internally-fed medlow headbox for handling heavy solids loading
- Heavy duty stainless steel
- EZ-Care lube-free drive system
- Trunnion wheel and stabilizer pad
- Automatic water spray system with quick disconnect nozzles

### General specifications

- Dimensions: 91 ½" L x 50 ½" W x 41 ½" H
- Weight: 1,500 lbs.
- Service water: 30 GPM at 50 PSIG
- Feed: 45-100 GPM, based on screen size and opening



Wedge wire: 0.020" and 0.060"



Perforated panels: 1mm and 2mm



Wire mesh: 200 µm

### Service connection

- Service water inlet: 1"
- Feed water inlet: 8"
- Filtrate water outlet: 10"



## Hycor® Rotostrainer®

### Externally-Fed Rotary Wedge Wire Screen

- Handles difficult solids such as scum, oily and greasy materials
- Oversized headbox with enough weir length that allows for 100% bypass in overflow situations
- Automatic doctor blade cleaner to facilitate solids removal

### General specifications

- Skid dimensions: 4' L x 3' W x 4' H
- Stainless steel construction
- Influent and effluent: 4" dia.
- Wedge wire opening available in 0.010", 0.020" and 0.060"
- Capacity: 1000 GPM
- Unit-mounted E-Stop
- Service water: 0.5", solenoid control
- Power: 480V, 30A, 3 phase
- NEMA 4x control panel on a skid: 4' L x 3' W x 6'6" H



## Hycor® Hydroscreen™

### Bi-wave Static Screen

- Wedge wire pivoting screen panel
- 48" wide screen with 0.010" opening
- Hydraulic loading up to 80 GPM
- All stainless steel
- Drip lip to discharge drier solids
- Comes with screenings collector hopper
- Handles fibrous and non-greasy solids
- Pilot unit dimensions: 5' L x 4' W x 7' H
- Weight: 1,000 lbs.



## Hycor® Helixpress® SPR230

### Shaftless Spiral Dewatering Press

- Cost-effective solution for dewatering screenings collected by any type of screen
- All-in-one conveyor, collector and dewaterer
- Reduces weight and volume, resulting in reduced hauling and disposal costs

### General specifications

- Dimensions: 104" L x 42" W x 60" H
- Weight: 904 lbs.
- 60" trough, 3HP drive
- 0.020" wedge wire
- Unit-mounted E-Stop
- Spray box with solenoid control
- Power: 480V, 30A, 3 phase



## SRC Oil/Water Separator

### Slant Rib Coalescing Oil / Water Separator

- Coalescent separation process separates twice the flow in 20% less volume
- Coalescing ribs angled 55° to maximize solids settling
- Special baffle system controls flow and minimizes surges for more reliable separation
- Sloped sludge chamber for complete sludge removal
- Removes free, non-emulsified oil and settleable solids
- Produces effluent of 10 mg/L of oil droplets 20 microns or larger
- Pilot units available in two convenient sizes: SRC 50 and SRC 15
- High throughput; Efficient separation

### Physical specifications

- Construction: Carbon steel-painted
- Media: HPVC

Model	Length	Width	Height	Weight	Influent Dia.	Effluent Dia.	Sludge Dia.	Oil Dia.
SRC 50	109 in.	50 in.	93 in.	1650 lbs.	4 in.	4 in.	3 in.	3 in.
SRC 15	97 in.	38 in.	49 in.	1140 lbs.	3 in.	3 in.	3 in.	3 in.



## Lamella® Gravity Settler and Thickener

### Lamella Automated System on a Skid

#### Main skid: LGS 125 EcoFlow® with integral flash / floc tank

- 125 ft<sup>2</sup> of projected surface area
- Hydraulically rated for 100 GPM (application specific rating will vary)
- Typical flow is 63 GPM at normal loading rates of 0.5 GPM/ ft<sup>2</sup>
- Unit dimensions: 7' D X 14' L
- Pre-wired and pre-piped
- Power: 480V, 30A, 3 phase

#### Instrumentation and controls

- Allen Bradley PLC and HMI
- Influent and effluent turbidity analyzers
- Influent pH control loop
- Mag meter for flow
- Rotameter for visual flow
- Level indicator/transmitter

#### Ancillary units

- 500-gallon HDPE collection tank
- Four chemical metering pumps
- 50-gallon day tanks with covers
- Sludge withdrawal Wilden AOP pumps
- Sludge return (seeding) Wilden AOP pumps

#### Auxiliary skid: 1,500 gal, HDPE open top reaction tank with mixer



## ThickTech™ Rotary Drum Thickener

#### Rotary Drum Thickener- RDT 100 Pilot Trailer

- Complete system on trailer sets up and ready to test in hours
- Capacity: 80-100 GPM

#### General specifications

- Dimensions: 36' L x 8'6" W x 10' H
- Weight: 12,000 lbs.
- Service water: 30 GPM @ 50 PSI / 9 GPM of water at a minimum of 40 PSI
- Power requirements: 480V, 30A, 3 phase

#### Service connection

- Service water inlet: 1"
- Filter water outlet: 3"
- Sludge outlet: 3"
- Sludge inlet: 2"

#### Trailer equipped with

- Chemical metering pumps
- Booster pump for polymer make-up water line
- Polymaster chemical make-up system
- Gorman Rupp self-priming sludge pump for feed
- Hopper containing progressive cavity auger feed pump
- Camlock fittings and flex hoses
- A NEMA 4X standard control panel, 304 stainless steel





## DynaSand D2<sup>®</sup> EcoWash<sup>®</sup> Media Filter Pilot Trailer

### Fully automatic, dual or single stage; Equipped with ENR controls

- Loading rates: 3 GPM to 7 GPM / s.f.
- Flow: 36 GPM to 84 GPM

### Performance specifications

- TSS < 3 mg/L
- Ultra-low phosphorous: <0.02 mg/L
- Ultra-low nitrogen: <3 mg/L TN
- Reject water < 2% of influent
- Low SDI <2

### General specifications

- Trailer dimensions: 44' L x 8'6" W x 13'6" H during transport
- Height of trailer during operation when filters are erect: 25'
- Weight: 30,000 lbs.
- Deep bed filter: DSF 12 with 80" of 1.4 mm coarse media
- Standard bed filter: DSF 12 with 40" of 0.9 mm or 0.7 mm fine media
- Power requirements: 460V, 30A, 3 phase

### Trailer equipped with

- Allen Bradley PLC and HMI
- Chemical metering pumps with draw down calibration column
- Multiple chemical injection points and in-line static mixers
- ChemScan analyzer
- Instrumentation for turbidity, DO, pH
- Camlock fittings and flex hoses
- Climate controlled control room
- Submersible influent feed pump
- Air compressor
- Air control panels for each filter
- Flow meter for influent and reject lines from each stage
- Autosampler



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