

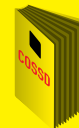
COSSD PRODUCT CATALOGUE

for



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Black Opal
ENERGY SERVICES INC.

#5, 26313 Township Road 531A
Box 1
Acheson, AB T7X 5A3

Phone: 1 (780) 948-9989

Fax: 1 (780) 948-9911



Products

We carry a complete product line of our wastewater treatment plants which are available for rent/lease, rent to own and purchase. Our plants are space, energy and manpower efficient and incorporate leading edge design with exceptional build quality and durability with excellent effluent results. [Learn More](#)

In addition to our wastewater treatment plants, Black Opal Energy Services is the sole Canadian distributor of a world patented Extreme Separator Technology. The ExSep is a highly efficient pre-treatment process for wastewater, it's based on the use of hydraulic flows that are exclusively developed from gravitational forces inside the modules cylindrical body. The result is an almost 100% separation of solids in the course of a single treatment.

The Multi-Pack Support Unit has been designed to provide a complete utility package for oil & gas drilling wellsites or campsites. This single unit houses power, sewer and water. In addition to the necessary amenities there is also a washroom, change room, laundry and emergency shower/eye wash to support oilfield operations. [Learn More](#)

We also rent, sell and service many different wastewater and potable water storage and distribution solutions ranging in size from 2,500-10,000 gal. Can build to suit. [Learn More](#)

Services

Customer satisfaction is a top priority and we are committed to providing our client with exceptional customer service. Our team of qualified operators and service technicians are trained on all of our equipment, competent in their fields and are available 24/7 to address our clients concerns and maintain our equipment. Services offered by Black Opal Energy Services are:

Installation and tearouts of our treatment plants, storage and distribution solutions and 3rd party equipment

Operations and remote monitoring of our treatment plants and 3rd party equipment

Service and maintenance of our treatment plants, storage and distribution solutions and 3rd party equipment

Dispersal field design, permitting and installation

Wastewater Treatment Plants

WASTEWATER TREATMENT PROCESS

1. Mechanical pre-treatment using ExSep Technology [Learn more](#)
2. Membrane-Bio-Reactor(MBR) [Learn more](#)
3. Sludge Dewatering [Learn more](#)

Performance

Parameter	Unit	Range of Influent	Canadian Regulation for Environmental Protection Zones	Effluent Quality
Chemical Oxygen Demand (COD)	mg/L	200-800	50	<50
Biological Oxygen Demand (BOD)	mg/L	100-400	<10	<5
Total Suspended Solids (TSS)	mg/L	100-350	<5	<1
Total Kjeldahl Nitrogen (TKN)	mg/L	15-45	<2	<2
Total Phosphorus (TP)	mg/L	5-15	<1	<1
Fecal Coliforms	(Counts/100ml)	-	<100	<100

BENEFITS

- Relieved and downsized subsequent treatment because of highly efficient primary treatment by ExSep
- Compact and energy efficient
- Low operating costs
- Large space savings compared to conventional solutions available on the market
- Completely enclosed design avoiding odour disturbances
- Operation via touch panel on site or completely remote controlled by computer or smart-phone
- Complete sludge treatment on site producing a dry solids content of $\geq 15\%$
- Flexible expandability of the systems due to their modular design
- Short lead time
- Quick commissioning;

WASTEWATER TREATMENT PLANT CAPACITIES

- 10 m³/day Multi-pack
- 12.5 m³/day or 40 Persons
- 25 m³/day or 80 Persons
- 60 m³/day or 200 Persons
- 120 m³/day or 600 Persons



Multi-Pack Support Unit

The Multi-Pack Support Unit has been designed to provide a complete utility package for oil & gas drilling wellsites or campsites. This single unit houses power, sewer and water. In addition to the necessary amenities there is also a washroom, change room, laundry and emergency shower/eye wash to support oilfield operations.

Our Multi-Pack Support Unit has been built on an oilfield skidded building 11'(w) x 11 ½'(h) x 55'(l) and is designed, built, owned and operated by Black Opal Energy Service Inc.

BONUS FEATURES INCLUDE:

MULTI-PACK FEATURES

- Wastewater Treatment
- 10 m3 (30 Person) Membrane Wastewater Treatment System
- Remote monitoring and operations
- Excellent effluent deliverables meeting and exceeding regulatory standards;
- CBOD < 5 ppm
- TSS<1 ppm

POWER GENERATION

- Dual 100 kw Generators
- Backup generator continuously heated and battery charge
- Automatic transferring to backup generator
- Remote monitoring
- 1,000 gal fuel storage providing 5 days of run time

POTABLE WATER DISTRIBUTION

1,800 gal potable water storage and distribution

ADDITIONAL FEATURES

- Emergency Shower & Eye Wash
- Washroom
- Change room
- Dual washer & dryers
- 1000 Watt Multi-Direction Light Tower
- 25' Retractable mast
- LED Technology with 25 year life expectancy
- 19° Beam Focus for high intensity lighting
- External Building lighting
- Retractable building steps with travel locks



Storage and Distribution Solutions

Potable and storage capacities range from 2500 gals up to 10,000 gals. All are skidded, insulated and heated with low and high alarms.



Wastewater Treatment Plant Features

REMOTE MONITORING AND OPERATIONS

Remote monitoring and operating ensures optimal results for regulatory compliance and reduces unnecessary service costs.

With access to internet either cell phone service or satellite service our operators can remotely monitor and operate all aspects of the waste water treatment plant. A schematic of the plant allows for visualization of capacity, fill volumes, flow rates, valve position and operational status equipment such as blowers and pumps.

Furthermore our trained Operators can control operations of the plants remotely and complete functions such as starting and stopping pumps, clearing errors and starting/stopping entire processes. Our plants have alarms for low and high tank levels, equipment errors, low temperatures and our operators receive instant notification if any pre-set parameters deviate from expected. The Programmable Logic Controller or PLC also records data and provides real time and historical trends which our Process Engineers can review and optimize plant performance.

SLUDGE DEWATERING

All sludge produced in the treatment plant is dewatered and pressed to a high dry solids content of approx. 15 % or even higher (depending on the sludge origin) without using any chemicals. A buffer tank collects the dried sludge, which is then extracted by an auger. This solution requires low maintenance efforts because the collected sludge cake can be stored for a comparatively long period of time in a sludge bin within the container and disposed of easily.

LOW ENERGY CONSUMPTION

Though the selection of energy efficient equipment with low power consumption our packaged systems have significantly smaller power requirements than conventional systems.

Power Requirements	
Plant Size	Energy Consumption
10 m3/day Multi-pack	14 Kw's
12.5 m3/Day(40 Persons)	16 Kw's
25 m3/Day(80 Persons)	18 Kw's
60 m3/Day(200 Persons)	22 Kw's
120 m3/Day(600 Persons)	37 Kw's

MEMBRANE BIOREACTOR (MBR)

Wastewater enters the anoxic zone of the plant where it mixes with the return sludge. There a de-nitrification process using Bio-Media takes place. Bacteria stick on the free floating Bio-Media and accumulate. The wastewater then passes the aeration zone where the bacteria grow and consume organics that are in the wastewater. The final treatment within the MBR is done by a subsequent membrane filtration.

This process also eliminate suspended solids as well as micro organisms resulting in a high level of effluent quality Due to the highly efficient Bio-Media and the absence of secondary settlement tanks, the MBR is extremely compact and space saving.

ExSep Technology

WHAT IS IT?

The patented Extreme-Separator ExSep® is a treatment device for mechanical solid/liquid separation. In the municipal wastewater treatment, ExSep® replaces sand and fat trap as well as huge sedimentation tanks. In the field of industrial wastewater treatment, ExSep® takes over the complete primary treatment. ExSep® is characterized by an efficiency of up to 99.9% in the separation of organic and inorganic solids (particle size $\geq 15\mu$). Throughput capacities of the scalable ExSep® range from 0.5 to 500m³ per hour.

The operation of the ExSep® is based on a combination of gravitational forces and the laws of fluid dynamics and thus requires no energy as well as no chemicals. Separated solids sink to the bottom of the cone shaped device where the suspension thickens and is sucked off for subsequent sludge treatment.

BENEFITS OF THE EXSEP

- Relief of subsequent treatment steps such as membrane and biological filtration
- Huge space savings
- No chemical flocculants necessary
- Low investment and maintenance costs
- High separation efficiency of up to 99.9%
- Compact and robust design
- Made of austenitic stainless steel

Clean Tech Water Treatment

- Remote Monitoring Technology
- Latest Cassette Membranes Technology
- In unit sludge dewatering
- No flocculants required
- No chemicals used in treatment process
- Low energy draw
- All major components have automatic redundancy

