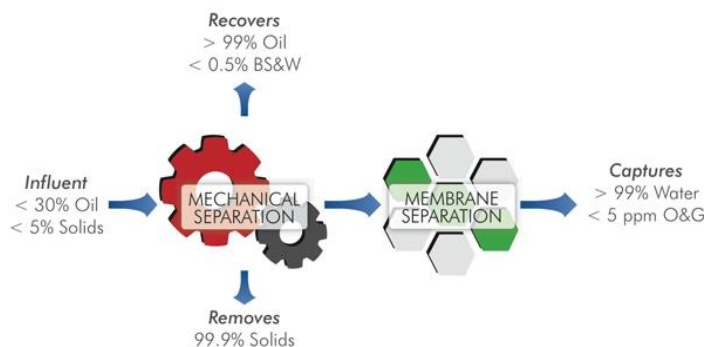


Solving your tough water - oil separation problems

IMS by CLEAN INDUSTRIAL

CLEAN INDUSTRIAL is introducing an integrated industrial wastewater treatment system designed to achieve outstanding product quality, reduce operating costs and exceed the most stringent environmental requirements.

Our IMS System is an integrated platform consisting of an upfront centrifugal separator to separate bulky oil and water emulsions (up to 30-50% oil) followed by a membrane-based separator to further polish the water of its remaining oil and solid content.



Integrated System tuned to your specific water re-use requirements

Our IMS System is a highly effective centrifugal + membrane de-oiling process compared to other technologies such as decanters and disk stack centrifuges. Our proprietary IMS System is unique:

- Lower shear force imposed on the influent
- Large hold up volume leading to higher centrifugal force impact (g-force – seconds)
- Lower specific energy consumption
- Adjustable wear size to manage various oil densities
- Low operating and maintenance requirements

The technology has been applied in a variety of oil dewatering applications including Oil spill clean-up, tEOR produced water treatment, and industrial oil/water separation.

- Requires significantly less cleaning, less downtime and very reliable continuous operation.
- Is 2.5x less expensive than other similar treatment systems
- Can provide the client with customized water ‘*designer water*’ as effluent for re-use in the specific processes required by the operation.

“COMPACT, ROBUST oil & water separation, the most effective membrane solution for oily wastewater treatment

Features	IMS System	Conventional Oil-Water Separators ²
Footprint	↓	↑
Power	↓	↑
Capital Expense	↓	↑
Operating Expense	↓	↑
Influent Solids Content	<5%	<0.1%
Influent Oil Content	<30%	<2%
Oil Product Recovered	>99%	Not applicable
Purified Water Recovered	>99%	80-90%
Water Purity ³	<5 ppm	30-50 ppm
Liquid Waste	<1%	10-20%

- **Better Oil Removal (<5ppm O&G)**
- **Compact**
- **Automated**
- **Modular & Mobile**
- **Near Zero Liquid Discharge**

¹ Based on prior tests with specific influents. Actual performance may vary.

² Gravity/plate separators + gas flotation / hydrocyclone + nutshell filters

³ Total oil & grease per EPA 1664

Oil and water returned to the customer – saving time and money and reducing environmental footprint

KEY BENEFITS OF THE CLEAN INDUSTRIAL'S INTEGRATED WATER TREATMENT (OIL-WATER SEPARATION) PLATFORM

- Skid-mounted, compact, highly automated system with few moving parts
- Unmatched industrial water de-oiling and reclamation of valuable oil product
- Near-zero liquid discharge with flexibility towards feed quality variations and surges
- Effective customization for downstream effluent requirements
- Reduced CAPEX and OPEX; lower cost of water treated = lower cost of operations
- Reduced process residence time, quicker process start up and stabilization
- No chemicals required
- Ease of operation, remote monitoring, highly reliable



400M³ / day unit in operation at steam assisted EOR operation.

- Large throughput capacity capabilities, due to the systems modular design (400M³ / day per module)
- Our on site assessment includes preliminary process review by our world class process engineering specialists ensuring a tailored solution for your needs.
- Professional and experienced water treatment service by veteran on site water management operators.
- All units are 100% compliant with the highest safety and regulatory standards specific to the AB market

Clean Industrial's rapid and mobile oil recapture & water recycling system, the clean water returns to the process tank for re-use, providing a simple solution for protecting freshwater supplies while improving production and reducing disposal and maintenance costs.

Clean Industrial is ready to deploy its water treatment and management services as well as provide the supplemental engineering support to integrate, operate, and service a tailored solution that suits your unique needs of your operation.

Our process ensures efficient water – oil separations and we can rapidly upgrade many different types “slop-oil” from from SAGD, tEOR and other industrial operations. **Clean Industrial** guarantees an immediate payback.

Our IMS platform enables us to handle wastewaters (water-oil emulsions) that have tremendous variations in composition both chemical and physically. The common thread is that they contain both water and solid impurities, large and small. Even with waters that form a very tight emulsion, our process can be tuned to produce drinkable water and transport ready oil.

Our integrated system deals with the most difficult trait of slop oil. An oil and water emulsion stabilized by ultrafine solids, which is extremely difficult to separate.

Preliminary Technical Specifications (IMS 5000)

Throughput / Flow Rate:	800 cubic meters / day
Power Source:	440v – 480v / 60 Hz / 3 phase UL/CE certified & CSA approved
Control Voltage:	120v or 220v (internally supplied)
Power Demand:	400 kW (<i>approx. 150+ kW per 2500 module</i>)
Operation Temp:	Up to 185° F (85° C)
Influent Water:	Oil content up to 1000 ppm & Solids content up to 1000 ppm
Effluent Water:	Hexane extractable oil and grease <5 ppm, TSS<10 ppm, SDI = 1 or less
Dry Weight:	40,124 lbs. (18,200 kg)
Wet Weight:	108,097 lbs. (49,032 kg)
Footprint:	3000 ft ² - 3 high cube standard 40 ft intermodal customized trailers, plus interconnecting pathways and piping OR 1 53ft intermodal customized trailer (~550 ft ²) plus storage tankage of (2700 ft ²)

Functionality

- The ceramic membrane separation component cleans the effluent of finely dispersed/emulsified oil and colloidal solids.
- The system is equipped with a patented *IntelliFlux*TM operational program, a proprietary membrane control philosophy based on years of fundamental membrane research. Process controls are automatically and intuitively determined based on the fouling propensity of the influent water to ensure sustainable membrane performance. The result is an adaptive system that maximizes membrane cleaning efficiency and lifetime while minimizing system down time, thus contributing significant savings to both capital and operating costs.
- The system has designed redundancies to allow continuous operation with minimum expected annual downtime limited to 72 hours for scheduled maintenance and replacement of consumables.

Compliance

- All the electrical/electronic components are CE/UL and CSA conforming.
- All operators and mechanical components and containers are OSHA, OSHA, SECOR, Comply Works, ISNET and EVITTA compliant.
- All maintenance functions and safety shutdown measures are checked in accordance with the programmable logic controller and oil content detector/fire suppression, and remote gas monitoring.