



# EXTRACT, PURIFY, TRANSFORM.

Turn the water you have  
into the water you want.™

V<sup>+</sup>SEP®

# Syngineering have taken water enhancement to a new level. Introducing VSEP.

Syngineering pride ourselves on our ability to bring you the world's most advanced technology.

Case in point, VSEP developed by New Logic.

Short for Vibratory Sheer Enhanced Process, VSEP has evolved from a simple liquid separation system to a highly sophisticated suite of products capable of processing thousands of litres of fluid per minute.

It has progressed from microfiltration and ultrafiltration membranes for dewatering applications right through to robust nanofiltration and reverse osmosis membranes.

The result is a patented system that can facilitate the separation of both suspended and dissolved solids in a single piece of equipment.

Additional innovations have been constantly incorporated, specifically fully automated separation systems, spiral-wound reverse osmosis systems, membrane performance chemicals, and more.



BRISBANE | SYDNEY  
ROMA | CHINCHILLA  
**P 1300 662 326**  
**E** [info@syngineering.com.au](mailto:info@syngineering.com.au)  
**syngineering.com.au**

AUCKLAND  
**P 0800 796 344**  
**E** [info@syngineering.co.nz](mailto:info@syngineering.co.nz)  
**syngineering.co.nz**

# State-of-the-art membranes.

*Membranes have been used to remove dissolved solids from water since the 1950's, but today's membranes provide more throughput and better chemical resistance.*

## Membrane Technology

Membranes allow clean water to pass through (the permeate) while rejecting the undesirable contaminants (the concentrate or slurry).

There are four general classifications of membranes, any of which can be used in a VSEP.

**Microfiltration** (MF) membranes are the most porous, with a range of 0.1 $\mu$  - 2.0 $\mu$ . MF membranes are especially useful in dewatering slurries.

**Ultrafiltration** or UF membranes come in sizes from 0.008 $\mu$  - 0.1 $\mu$  and are used in a variety of VSEP applications where the goal is to hold back 100% of the suspended solids. UF membranes will remove large organics such as proteins, pyrogens, bacteria and colloids. UF membranes can also be used in VSEPs to break emulsions without using chemicals.

**Nanofiltration** or NF is the newest membrane type – they can be used to remove organics and many dissolved materials such as hardness. NF membranes are often used in wastewater treatment to remove BOD, but can also be used as pre-treatment to a RO VSEP or spiral RO system. The permeate from a nanofiltration membrane is a “soft” water.

**Reverse Osmosis** or RO is the “tightest” of all the membrane types. RO membranes are designed to hold back sodium chloride (NaCl) and are rated by their ability to do so. For example, seawater desalination membranes are typically rated to reject 99.5% NaCl.

In VSEP systems, RO membranes are often used to remove organics, trace oil, and trace metals in a single unit operation. RO membranes have been much maligned in the industrial realm due to their high fouling potential. VSEP's vibration mitigates this risk, thus opening the door to a huge variety of applications where removal of low molecular weight contaminants from a wastewater stream is desired.

# Shake, rinse, repeat... to reduce fouling.



## VSEP

VSEP is the world's first vibrating membrane separation system. By applying vibratory shear waves directly at the membrane surface, VSEP is able to separate difficult feed streams including high levels of suspended and dissolved solids, oils, organics and other problematic constituents.

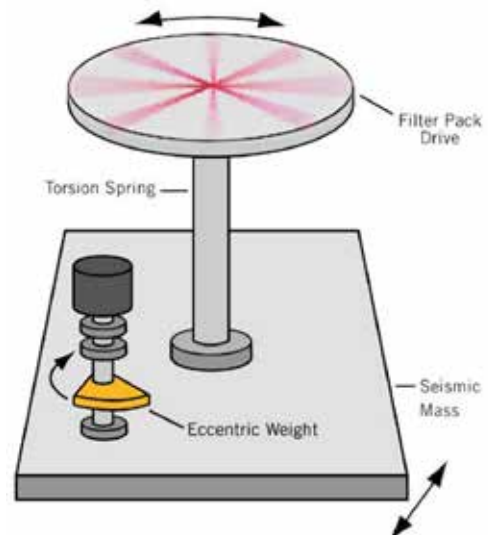
## Good Vibrations

VSEP's vibration comes from its one moving part: the eccentric weight bearing. As the bearing spins, the weight induces a vibratory action that is translated to the seismic mass. The vibration is sent through the torsion spring and on to the filter pack drive. The filter pack then moves back and forth 54 times per second at an amplitude of 16mm. The extreme shear created by this rapid change of direction makes it exceedingly difficult for foulants to attach to the membranes.



To learn more about  
VSEP technology, visit  
[www.vsep-pacific.com](http://www.vsep-pacific.com)

*VSEP  
Resonating  
Drive System*





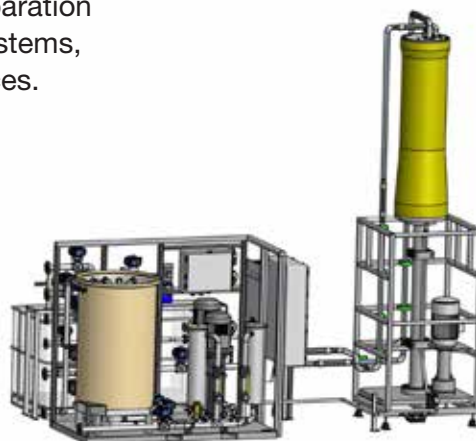
# Choose from three separate separators.



Syngineering offer you a complete suite of VSEP separation systems as well as spiral-wound reverse osmosis systems, performance chemicals, engineering, and field services.

## Series i

Available in three sizes (i18, i36 & i84) the Series i was the first and remains the most popular product family. The largest and most commonly used VSEP is the i84— multiple modules of which can be arranged in parallel to meet any flow rate. All Series i systems are available fully automated and require very limited operator interaction.



### Series i18

The smallest of the VSEP line, the i18 is perfectly suited for smaller flows. The available membrane area in the i18 filter pack ranges from 14m<sup>2</sup> to 27m<sup>2</sup>.



### Series i36

Between the i18 and i84 lies the i36. A perfect size for high solids applications and moderate flow rates, the i36 was the original workhorse of the Series i family. The available membrane area in the i36 filter pack ranges from 42m<sup>2</sup> to 56m<sup>2</sup>.



### Series i84

The most widely used VSEP is the i84. With up to 130m<sup>2</sup> of membrane area in each filter pack, the i84 is the ideal module size to process larger flow rates. Many i84 system configurations are available, and one is sure to fit your needs.

# Low volume, high tech.



## P50

When your flow rates don't justify a Series i, the P50 is often a good choice. Designed to fill the gap between the Series i and the LP, the P50 can process a few litres per minute, and is perfect for applications such as precious metals recovery and other high value/low flow applications.

## LP

The "LP" in Series LP stands for Lab and Pilot. This innovative VSEP system can be configured for use in lab mode or in pilot mode. Perfect for data gathering and application development, the LP is New Logic's choice for feasibility studies and on-site pilot work.



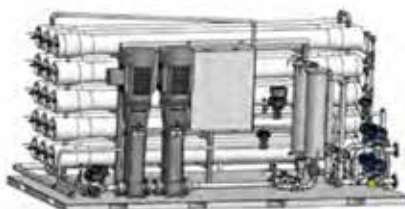
## Series B

The smallest VSEP is the Series B—a scaled down, low pressure version of the Series LP. Designed primarily for demos, the light and quiet Series B is a favourite of our salespeople and manufacturer's reps.

# Other brilliant innovations.

## Spiral RO Systems

There's no shortage of Spiral Reverse Osmosis manufacturers, but unlike the rest, these spiral systems are built to the most stringent industrial standards. High quality skids, valves, plumbing and automation means you spend less time turning valves and more time enjoying the benefits of a well-designed system.



Spiral RO systems can be either supplied as standalone units or supplied in combination with VSEP units – either before or after the VSEP system. Typical applications where VSEPs are used in combination with Spiral RO units include processing Coal Seam Gas or field water and drinking water or potable water production.

## Performance Chemicals

Even the most innovative membrane systems need a good cleaning now and then. That's why membrane performance chemicals have been developed. In addition to membrane cleaners, there are also a variety of flux enhancers and anti-scalants to help keep your VSEP (or other membrane system) operating at peak performance.



To see the entire research product line, visit  
[www.vsep-pacific.com](http://www.vsep-pacific.com)

# Can we do it? We've probably already done it.

The number of VSEP applications grows daily.



## WATER

All water is not created equal. VSEP enables you to take advantage of poor source waters.

## PROCESS

Separations can be difficult and expensive.  
Reduce costs and process stress with VSEP.

## WASTE

Other breakthrough technological advancements in waste filtration achieved by VSEP include:

- Produced water and RO reject
- Acid mine drainage
- Drinking water
- Oily wastewater
- Precious metal recovery
- Colloidal silica
- Coal Seam Gas applications

Avoid regulatory headaches while saving money by treating your waste on-site.

VSEP has been thoroughly proven in the field, in numerous different waste treatment capacities.

The system has proved invaluable in many landfill leachate projects in the Americas, most notably in Virginia, USA, Panama City, Panama and Buga, Colombia where it has minimised and in fact eliminated the adverse impact of leaching on the catchment area environments.

Refer to the case studies and videos on our website:  
[www.vsep-pacific.com](http://www.vsep-pacific.com)



# Syngineering's seamless integration: Ensuring everything 'flows'.

*From lab test to full-scale start-up in under six months, plus literally everything in between – engineering design, project management, testing, installation, commissioning, certification, operation, maintenance, support, the entire 'box and dice'.*

## Lab Testing

Send us a sample and we'll prove it works. Visit us to see it work in person.

Over the decades, we've probably compiled data on an application just like yours and know in advance how to solve your problem. However because every stream is different, we'll test your sample at our lab to ensure we can give you the separation you need.

## Project Management

Your project manager will guide you through the design process, giving you options along the way, keeping you in the loop, and ensuring that everything is always fully operational.

We focus on meeting cost, quality and schedule targets, using our training, experience, knowledge of the supply chain and lean management skills to deliver on time and on budget.

## Installation & Commissioning

We do everything to ensure your installation is completed without a hitch.

Our field techs come to you to ensure a smooth start-up and train your operators, or you can visit our purpose-built training facility.

An open channel of communication has yielded a well-designed, fully operational separation system, backed by unmatched service. You'll enjoy a lifetime of free support via phone and email.

Our experienced teams specialise in installing/ commissioning water treatment plants, RO plants, transfer pumping stations, and more.

## On-Site Pilot Testing

We then gather more data on a larger volume of feed material, often using up to 32 times more membrane area and fine-tuning the operating parameters while gathering data sufficient for a full-scale design.

Relax — our VSEP series LP and a field technician will come to you with a massive fleet of pilot systems and we'll have all the data we need in a few weeks.

## Engineering

It's all about collaboration, heeding your specific needs and custom-designing the ultimate separation system for your facility.

Australia's most innovative and versatile engineering company provide services such as mechanical, process and electrical design, process and electrical engineering design, drafting technical writing, project engineering, RPEQ certification and more.

We offer simple but effective solutions for Coal Seam Gas, industrial, commercial, mining & civil applications.

## Operation

Syngineering offer you a fully integrated service, and that includes operating the VSEP system too.

You can rely on our team to set the system up perfectly and to iron out bugs BEFORE it goes live.

We can operate VSEP indefinitely, or until your staff are trained and proficient enough to take over.

## Ongoing Maintenance and Support

As a single source, we provide ALL your requirements. Long after the system is running smoothly, we'll be there to offer maintenance, upgrades, advice, trouble-shooting and support. It's the perfect way to complement an amazing system.

# A typical VSEP leachate project

“*Extending the life of an existing landfill is much less expensive and intrusive to the environment than construction of a new landfill.*”

VSEP has been successful in controlling leachate in many landfill operations, including this typical scenario...

A solid waste landfill had been storing the leachate in three large temporary ponds that were filling fast, and with the area's population increasing and pollution laws becoming stricter, a longer-term solution was called for.

## Solution

Drawing on the success of other VSEP landfill plants, the owners implemented a full-scale VSEP system that used two of the large 2.13m VSEP modules.

As the discharge was to be released into a nearby river and used as industrial water on site, two passes were called for to ensure the discharged filtrate contained total dissolved solids (TDS) less than 1500 mg/L and chemical oxygen demand less than 250 mg/L.

The ponds were downhill from the landfill and therefore used gravity to flow the leachate instead of pumps. The VSEP was set up after the second pond as the third pond was treated and is now to be used as a treated water collection pond for leachate from the other two ponds.

## How This VSEP System Works

Leachate flows to the VSEP RO modules before the permeate passes through the spiral RO system and is finally deposited into pond 3, where it is to be used for industrial purposes or discharged into the stream.

When pond 1 reaches a certain volume level, leachate is pumped from the bottom of this pond back to the top of the solid waste landfill, creating a full recirculation with a high clean water output.

VSEP filtration is able to remove up to 95% of the TDS; it is also able to remove ALL bacteria and faecal matter.





## The Benefits

- More rubbish can be handled at the tip
- Less leachate stored onsite
- The membrane is also removing more than 98% of heavy metals
- As VSEP is modular, future expansion is easy
- The operators of this landfill can use this system as a blueprint for other landfills.

## Syngineering Ensures Everything 'Flows'

From lab test to full-scale start-up in under six months, plus literally everything in between – engineering design, project management, onsite pilot testing, installation, commissioning, certification, operation, maintenance, support...

We can assist with the entire 'box and dice'.

Call us today for more details, or visit our website:  
[www.vsep-pacific.com](http://www.vsep-pacific.com)



# Put Syngineering to the test today.

## About the Syngineering Group

At Syngineering, we help you to create products that exceed expectations. We're passionate about providing you with the best design advice and expertise, and are skilled at producing professional engineering drawings for our clients.

## Real World Solutions

When working on your project, our engineers and tradesmen take great care to ensure that they fully understand your requirements. We then apply our extensive knowledge of 'real world' engineering to the issue at hand — to supply a cost-effective solution that's easy to implement and operate, and that fits in well with your existing work environment.

When you need engineering drawings you can trust, turn to Syngineering. Call us today to find out how we can assist with YOUR project.

BRISBANE | SYDNEY  
ROMA | CHINCHILLA  
**P 1300 662 326**  
**E** [info@syngineering.com.au](mailto:info@syngineering.com.au)  
[syngineering.com.au](http://syngineering.com.au)

AUCKLAND  
**P 0800 796 344**  
**E** [info@syngineering.co.nz](mailto:info@syngineering.co.nz)  
[syngineering.co.nz](http://syngineering.co.nz)

