Introducing Sparkle™ Hollow Fibers
Overview

- Markets/Products
- Client List
- Hollow Fibers
  - Removal
  - Examples
- Testing and Results
- Recommendations
Markets/Products

- Coalescers (Solvent Extraction)
- Nuclear Waste Treatment (Rotary)
- Membrane Filtration
  - Hollow Fibers
  - Tubular Modules
Client List (partial)

- Bechtel, Fluor, Aker Kvaerner, BHP-Billiton
- DuPont, Phelps-Dodge, Mitsubishi Motors
The SpinTek PE Hollow Fibers have many features and benefits over conventional PE and PES hollow fibers.

- The SpinTek HF manufacturing process results in a fiber that has uniform pores throughout.
- The SpinTek fibers are not asymmetric creating like pores on the ID and OD of the fiber.
- Outside-In or Inside-Out flow.
Features/Benefits (continued)

- Greater tensile strength.
- Smaller OD provides greater surface area.
- 65% packing density is achievable.
- 0.36 mm OD typical
Hollow Fiber Removal (Ultrafiltration)

- Biological (bacteria, parasites, Protozoa)
- Particulate (sand, cysts, algae)
End View Hollow Fiber
Hollow Fiber Bundle
Typical Prefilter

Carbon and Ion Exchange Removal

- Chlorine
- Arsenic
- Selenium
- Mercury
SpinTek HF Membrane Module Drawing

- MODEL NO: HF3776020
- FILTER AREA: 0.12m²
- CASE MATERIAL: ABS
- SIZE: LENGTH: 76mm, ID(A): 46.8
- INITIAL FLOW RATE: 7L/min - 0.1 MPa
LAICA Project Objectives

- Gravity feed hollow fiber module
- Compact, inexpensive module
- 1.55 liters of flow within 8 minutes
- 2 month+ cartridge lifetime
- Carbon prefilter
SpinTek Tests

- 0.5 micron fiber gravity flow test
- 0.5 micron fiber low pressure flow test
SpinTek HF Test Module

Inlet Side
SpinTek HF Test Module

Outlet Side
Gravity Test Setup

Two Tests Performed

- Decreasing flow rate vs. time
- Flow rate vs. static head pressure
Decreasing Flow Rate Over Time (Gravity Feed)
Flow Rate vs. Static Head
(Gravity Feed)

Flow of Water in 0.5 Micron

\[ y = 11.008x + 48.558 \]
\[ R^2 = 0.97848 \]
Pressurized Test Setup

- Pressure controller (PC 1)
  - 193Kpa
- Pressure indicator (PI 1)
- Manual valve
- Distilled water flow
- Nitrogen gas
- 20 liters distilled water
Pressurized Module Flow Rate

Flow vs. Pressure of 0.5 Micron Filter Module

y = 5.7597x + 32.228
R² = 0.98202
Gravity Flow vs. Pressurized Flow

Eight Minutes Filtration Volume
Gravity vs. Pressure

Volume of Water Collected, Liter

Static Head Draining from 9cm
Pressurized at 35kPa
Testing Summary

- 0.45 liters in 8 minutes with gravity flow only
- 1.9 liters in 8 minutes with 35 kPa of pressure
- Standard size low cost module meets flow requirements using very low pressure.
Recommendations

- Pressurized Pitcher Filtration
  - Long lasting filter throughput
  - Increased flow rate

- Optional Gravity flow only
  - Increase hollow fiber volume by 75%
  - Increase pitcher fill time to 15 minutes
Pressurized Pitcher Concept
HOLLOW FILTER MODULE
DETAIL C
Questions?