CHEMICAL, BIOLOGICAL AND RADIATION SENSORS
ROBUST WATER SAFETY MONITOR
Model # Minitect-SC - Suitcase
Model # Minitect-BP - Backpack

- Solar Powered
- Measures down to military Drinking Water Standards and Below *

FEATURES:
SIMPLIFY YOUR TESTING – ALL IN ONE SYSTEM
7 MAJOR CHEMICAL TESTS PROVIDED
FROM 4 To 10 RADIATION TESTS PROVIDED
LARGE NUMBER OF MICROBES DETECTED
THE WORLDS ONLY ALPHA-BETA IN WATER SENSORS
REAL TIME, IN-LINE, CONTINUOUS TRUE FAIL SAFE DESIGN WITH ALARM
DETECTS ALPHAS, BETAS AND GAMMAS, TRITIUM, RADON, RADIUM URANIUM
DETECTS CHLORINE, NITROGEN, TOC
NO REAGENTS REQUIRED
EASY INSTALLATION, CALIBRATION

APPLICATION:
- MONITOR COMMUNITY DRINKING, WASTERWATER, BOTH IN GROUND AND SURFACE WATERS, AGAINST RADIOACTIVE AND OTHER CONTAMINANTS.
- TERRORIST CONTAMINATION
- INDUSTRIAL CONTAMINATES: LABORATORY, POWER PLANT, AGRICULTURAL
- INDUSTRIAL ACCIDENT/ILLEGAL DUMPING
- RESIDUAL TREATMENT ADDITIVES

PROBLEM: Water sources are vulnerable to: accidental or knowing contamination by individuals, groups, industry and medical labs/hospitals, terrorist, naturally occurring radioactive materials (NORM) and residual treatment additives. Water districts and wastewater facilities have not had the option of a robust real-time monitor for radio nuclides and other contaminate. To date, no real time monitor has been available for radio nuclides and only individual monitors for specific chemical and biological contaminants have been available. This lack of a comprehensive, robust detection monitor has seriously hampered the development of an Online Contaminant Monitoring System (OSMS), required to protect the nation’s water.
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* Measures down to military Drinking Water Standards and Below for some waterborn hazards.

SOLUTION: Model Minitect combines several detection goals into one monitor. The Minitect continuously monitors radio nuclides using both ion exchange resin beads and particulate filter. Chlorine, TOC, and Nitrogen are monitored with detectors integrated within the Minitect system. Additional monitoring is available and will be tailored to specific needs on request.

PHYSICAL:

<table>
<thead>
<tr>
<th>MEASUREMENT</th>
<th>SENSITIVITY</th>
<th>TOP OF RANGE</th>
<th>SENSOR</th>
<th>Maintenance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLOW</td>
<td>0.5% of Reading</td>
<td>0.06gpm - 2gpm</td>
<td>Volumetric Flow</td>
<td>None</td>
<td>10 - 36 VDC Input</td>
</tr>
<tr>
<td>TEMPERATURE</td>
<td>0.15</td>
<td>32 - 100°F</td>
<td>RTD</td>
<td>Periodic Calibration</td>
<td>10 - 36 VDC Input</td>
</tr>
<tr>
<td>PRESSURE</td>
<td>0.2% Full Range</td>
<td>0-60 psi</td>
<td>Ceramic Diaphram</td>
<td>None</td>
<td>10 - 36 VDC Input</td>
</tr>
</tbody>
</table>

System flow rate
• Standard: 100 to 1,000 ml/minute
• Optional: Wide range of flow rates available
• Sample temperature standard: Up to 80°F liquid. (Optional to 115°F)
• Ambient temperature: 35 - 100°F
• Optional: Cooler model Cool-33 is used in case of higher sample or ambient temperatures.

MINITECT – SC - SUITCASE
Size and Weight: Minimum configuration *
• Dimensions: 20” wide X 26” deep X 6.6” high, plus laptop pc
• Hand Carry Weight: 40 lbs
• Shipping weight: 60 lbs

MINITECT - BP- BACKPACK SYSTEM
• Size and Weight: Minimum configuration *
• Dimensions: 2 each 12” wide X 24” deep X 8” high fits in optional backpack plus laptop pc
• System Weight: Includes solar panels and batteries, but excluding weight of the 2 Backpacks 25 lbs per backpack
• Shipping weight: 55 lbs

* Minimum configuration includes working system but only the alpha beta and gamma radiation sensors. Addition of Chem and Bio sensors will add to size and weight.
## CHEMICAL, BIOLOGICAL AND RADIATION SENSORS
### ROBUST WATER SAFETY MONITOR
- Model # Minitect-SC - Suitcase
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### CHEMICAL Model # SSS-33-5FT-R Water Security

<table>
<thead>
<tr>
<th>MEASUREMENT</th>
<th>SENSITIVITY</th>
<th>RANGE</th>
<th>SENSOR/ METHOD USED</th>
<th>MAINTENANCE TIME - ACTION</th>
<th>POTENTIAL MAINTENANCE COSTS - COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL CHLORINE</td>
<td>0.01 mg/l</td>
<td>0.01 - 10 mg/l</td>
<td>Amperametric Electrode Sterilizable</td>
<td>Every 12 months Replace gel caps And add Electrolyte Every 2 years Replace Sensor</td>
<td>Sensor - $1630 Gel Cap Cartridges - $90 Electrolytic Gel - $45 2 Year Costs $1900</td>
</tr>
<tr>
<td>PH</td>
<td>0.2</td>
<td>0 - 14</td>
<td>Amperametric Electrode Sterilizable</td>
<td>Every 2 Years - Replace Sensor</td>
<td>2 Year Costs $530</td>
</tr>
<tr>
<td>CONDUCTIVITY</td>
<td>10uS/cm³</td>
<td>20mS/Cm³</td>
<td>Amperametric Electrode</td>
<td>Calibrate Monthly. Every 2 Years - Replace Sensor Calibrate Monthly. It could be calibrated on the chlorine Schedule</td>
<td>2 Year Costs $630</td>
</tr>
<tr>
<td>TURBIDITY</td>
<td>0.001</td>
<td>0.00 to 10,000 FNU</td>
<td>UV Spectrometer</td>
<td>Periodic Calibration and Cleaning</td>
<td></td>
</tr>
<tr>
<td>OXIDATION REDUCTION POTENTIAL (ORP)</td>
<td>1mV Resolution</td>
<td>-1.500mV to +1.500mV</td>
<td>Amperametric Electrode Sterilizable</td>
<td>Every 2 Years - Replace Sensor Calibrate Monthly. Replace Reference KCl cartridge</td>
<td>2 Year Costs - $480</td>
</tr>
<tr>
<td>TOTAL ORGANIC CARBON (TOC)</td>
<td>0.1 mg/l</td>
<td>10mg/l - 10,000mg/l</td>
<td>UV Spectrometer</td>
<td>Replace UV Lamp when needed. Spare Lamps are supplied</td>
<td>2 Year costs sensor - $1634 EPA max limit 15ppb Other Dissolved metals may interfere with LEAD Measurement</td>
</tr>
<tr>
<td>LEAD</td>
<td>200 ppb</td>
<td>200 - 20,700 ppb(mg/l)</td>
<td>Solid State Detector</td>
<td>Calibrate weekly for beat results</td>
<td></td>
</tr>
</tbody>
</table>
### Biological - Model SSS-33-5FT-R

<table>
<thead>
<tr>
<th>MEASUREMENT</th>
<th>SENSITIVITY RANGE</th>
<th>TOP OF RANGE</th>
<th>SENSOR/ METHOD USED</th>
<th>MAINTENANCE TIME - ACTION</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realtime Continuous Monitoring yield results in seconds to &lt;4 hours depending on desired sensitivity. Cryptosporidium parvum &amp; Giardia Lambilia are classified as Protozoa. Pseudomonas, Salmonella, Shigella, E.Coli &amp; Legionella are classified as Bacteria. B.Subtilis, B. Thuingiensis &amp; B. Globilgi are classified as Spores</td>
<td>1,000 liter to 150/mL for Protozoa and Spores. 500/mL to 3,000/mL for Bacteria</td>
<td>Performance improves significantly as Particulates in the Range of 500nm Range decreases.</td>
<td>Multi-angle light scattering with 2D high frequency cameral yielding real time and continuous results.</td>
<td>Flow Cell Cleaning up to a maximum of weekly to every 8 weeks. Takes 30 minutes to perform this task with unskilled labor.</td>
<td>R&amp;D Programs are in progress to systematically improve the sensitivity to the 100/L level in most potable waters by early 2008.</td>
</tr>
</tbody>
</table>

**Future Classification**

Bacillus Cereus, Yeasts, Molds, Algae (various), pneumophila Yersinia pestis

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**Chemical, Biological and Radiation Sensors**

**Robust Water Safety Monitor**

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### RADIOLOGICAL – WATER SECURITY – MODEL - SSS-33-5FT-R

<table>
<thead>
<tr>
<th>MEASUREMENT</th>
<th>SENSITIVITY RANGE</th>
<th>TOP OF RANGE</th>
<th>SENSOR/ METHOD USED</th>
<th>MAINTENANCE TIME - ACTION</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Alpha</td>
<td>15pCi/liter</td>
<td>10,000pCi/liter</td>
<td>Crushed Scintillation Bed of Crystals preceded by Radon and Uranium traps</td>
<td>6 months for finished water Replace De-ionizer cartridges</td>
<td></td>
</tr>
<tr>
<td>Beta</td>
<td>1,000pCi/liter</td>
<td>50µCi/liter</td>
<td>Crushed Scintillation Bed of Crystals</td>
<td>6 months for finished water Replace De-ionizer cartridges</td>
<td></td>
</tr>
<tr>
<td>Gamma Dissolved</td>
<td>5,000pCi/liter</td>
<td>50µCi/liter</td>
<td>Nal Gamma Spec Scintillation Crystal</td>
<td>3 to 6 months for finished water. Replace Particulate Filter Cartridge</td>
<td></td>
</tr>
<tr>
<td>Gamma Particulate</td>
<td>5,000pCi/liter</td>
<td>50µCi/liter</td>
<td>Nal Gamma Spec Scintillation Crystal</td>
<td>3 to 6 months for finished water. Replace Particulate Filter Cartridge</td>
<td></td>
</tr>
</tbody>
</table>

Optional (see model SSS-33-5A. The ANALYTICAL, WATER-PURITY System)

<table>
<thead>
<tr>
<th>MEASUREMENT</th>
<th>SENSITIVITY RANGE</th>
<th>TOP OF RANGE</th>
<th>SENSOR/ METHOD USED</th>
<th>MAINTENANCE TIME - ACTION</th>
<th>EPA MAX LEVELS FOR DRINKING WATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tritium</td>
<td>20,000pCi/liter</td>
<td>1Ci/liter</td>
<td>Crushed Scintillation Bed of Crystals</td>
<td>6 Months for Finished Water Replace De-ionizer Cartridges</td>
<td>20,000pCi/liter</td>
</tr>
<tr>
<td>Radon</td>
<td>100pCi/liter</td>
<td>2000pCi/liter</td>
<td>Ion Chamber with Water Bubbler–Agitator</td>
<td>3 Months Clean Vapor Trap</td>
<td>Unregulated</td>
</tr>
</tbody>
</table>
Flow Chart Diagram of System

The following two pages shows the four screen shot displays of the SSS-33-5FT-R System for “Calibration, Testing, and Operations.”
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ALARM SET SCREEN

This screenshot allows the user to set all “Alarm Set Points” for all Detector Chambers

CALIBRATION SET SCREEN

This screenshot Displays & finds both Background & Source Counts, and sets Parameters.

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TEST SCREEN

This is the “Test Screen” which allows the user to test Primary Detectors and Functions.

OPERATE SCREEN

This is the “Main Screenshot” displaying All Functions of the System.

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