



**ENVIRO MEASURE INC.**

*MEASUREMENT & TECHNOLOGY SOLUTIONS*

## **RENTAL CATALOGUE**

***WE TAKE CARE OF THE EQUIPMENT  
SO YOU DON'T HAVE TO WORRY...***

**SOIL: SAMPLING & CHARACTERIZATION**

**WATER: SAMPLING & ANALYSIS**

**GAS: DETECTION & PERSONAL SAFETY**

**SERVICE: REPAIRS, WARRANTY & TRAINING**





**ENVIRO MEASURE INC.**

MEASUREMENT & TECHNOLOGY SOLUTIONS

**ENVIRO MEASURE INC. was founded by the same principals as Osprey Scientific Inc. to focus on rental equipment, service, repair and technical training in the environmental and remediation industry.**

### **ENVIRO MEASURE RENTALS...**

- Rental Equipment for soil, water, gas, and specialty items
- Technical support
- After hours pick up and drop off depots

### **ENVIRO MEASURE SERVICE...**

- Equipment warranty
- Service and repair
- Equipment cleaning and calibration
- Certificate of calibration

### **ENVIRO MEASURE TRAINING...**

- Environmental Field Analytics Courses
- Equipment Operation
- Calibration & Maintenance
- Customized Application Specific Courses
- Instruction In Method Principles And Theory
- Data Quality Objectives
- Hands-On Practical Lab Sessions
- Step-By Step Test Kit Methodology

OSPREY GROUP



**OSPREY SCIENTIFIC INC.**

MONITORING & SAMPLING SOLUTIONS

**SOIL: SAMPLING & CHARACTERIZATION** 2 - 6

**WATER: SAMPLING & ANALYSIS** 7 - 18

**GAS: DETECTION & PERSONAL SAFETY** 19 - 23

**SERVICE: REPAIRS, WARRANTY & TRAINING** 24 - 25

**APPENDIX** 26 - 32

## REASONS TO RENT

No matter what your rental needs are, you can be rest assured that you will be our highest priority to keep you working; not waiting.

EMI's trained service technicians ensure all equipment is in top working order and are available to trouble-shoot any issues that may arise in the field.

EMI's customer service staff are available to assist you in determining which piece of equipment is best suited to meet your application needs.

EMI's experienced shipping department is able to facilitate the efficient delivery of your rental, including customers in more remote field locations.

By staying informed of advances in instrumentation and equipment, EMI is able to provide an up-to-date rental fleet that keeps you on the leading edge of industry.

Daily, weekly and monthly pricing on our rentals provides you with the flexibility to meet your individual cost and scheduling needs; no hidden maintenance costs.

Renting allows you access to equipment that will provide the proper instrument for the application instead of adapting current equipment that may not be well maintained.

## FIELD SCOUT DIRECT SOIL EC METER



1 SET OF  
SINGLE USE  
CALIBRATION  
SOLUTION IS  
INCLUDED\*

The Field Scout Direct Soil EC Meter is designed with state-of-the-art sensor technology. Our exclusive paired sensor tip provides maximum soil-sensor contact and higher accuracy. The field scout gives you information crucial to managing your soil EC levels with the accuracy of standard SME readings. Used for direct measurement of salinity in soil. Best results when you make a paste from the soil sample.

### Rental Includes:

- 8" probe and meter

### Sold Separately:

- Calibration standards
- Gloves

### Specifications:

**Resolution** 0.01 mS/cm. Accuracy  $\pm 2\%$ . Automatic temperature compensation.

## AMS BASIC SOIL SAMPLING KIT



The AMS Soil Sampling kit contain stainless steel tools for the collection of samples in retaining cylinders. Designed for use in field situations where soil contaminants are at low levels or the protocol requires that the samplers be decontaminated in an acid bath. Comes with four types of auger heads for access to a sampling point. Three 4-foot extensions for drilling to approximately 12 feet. Collect an undisturbed sample in a liner with the AMS Core Sampler using the slide hammer and extensions.

### Rental Includes:

- 3 1/4" Regular, Mud and Sand Auger
- 3" Dutch Auger
- 2" x 6" Core Sampler with Aluminum liner
- Slide Hammer
- 1-1' Extension
- 3-4' Extensions
- Rubber Coated T-handle
- Standard T-handle
- 2 Adjustable Wrenches
- Slip Wrench
- 2" x 12" Nylon Brush

### Sold Separately:

- 2" x 6" plastic liners
- Liner caps
- Alconox cleaner

**NOTE:** Auger styles can be rented individually; Dutch Auger, Sand Auger, Mud Auger or Regular Auger.

**Rental Includes:**

- Sampler body
- T-handle

**Applications:**

- Core sampling for analysis of nutrient, moisture content and soil consistency.
- Turf sampling in parks, golf courses and yards.

**Sold Separately:**

- Alconox cleaner
- Liners
- Gloves

## AMS SOIL RECOVERY PROBE



AMS Soil Recovery Probes Dual Purpose model has a slotted design which allows for use for general sampling with or without a liner. Used with a liner ensures soil samples are not cross contaminated. This soil probe offers a simple way to collect shallow sub-surface soil samples.

**Rental Includes:**

- PetroFLAG meter
- Balance and timer

**Sold Separately:**

- Reagents
- Calibration standards
- Gloves

**Specifications:**

**A/D Resolution** 0.5 ppm

**Display Resolution** 1 ppm

**Quantification Limit** Analyte Dependent - From MDL to Max Linear Range  $\pm 10\%$  +5 ppm From Max Linear Range to Max Quantifiable Range  $\pm 20\%$

**Measurement Range** 10 - 10,000 ppm (parts per million)

## DEXSIL PETROFLAG



The Petro FLAG system provides a complete method for analyzing soil samples for the presence of total petroleum hydrocarbons (TPH). Petro FLAG™ tests for a broad range of hydrocarbons including diesel fuel, kerosene, crude oil, motor oil, hydraulic fluid, grease, transformer oil, and #2, #4, and #6 fuel oils.

# CHEMETRICS REMEDIAID



The RemediAid kit is ideally suited for use in soil-remediation surveys, as well as testing for spillage and leakage from petroleum refineries, petroleum stations, leaking underground storage tanks (USTs), or wherever petroleum hydrocarbon contamination is an issue. The RemediAid kit will determine Total Petroleum Hydrocarbons across a wide range of soil types and petroleum products, so it is ideal for use in the field.

The system enables the user to run 10 tests concurrently, providing the potential to run 25 tests in one hour. RemediAid can also be calibrated to measure quantitative amounts of specific petroleum products including: BTEX, PAH, diesel fuel, leaded and unleaded gasoline, weathered gasoline, brent crude, and lubricating oil.

### Specifications:

<b>Ranges</b>	Unleaded Gasoline: 40-370 mg/kg
	Weathered Gasoline: 40-360 mg/kg
	Diesel: 60-880 mg/kg
	Brent Crude: 60-770 mg/kg
	Lube Oil: 160-2160 mg/kg
	BTEX: 20-150 mg/kg
	Leaded Gasoline: 40-470 mg/kg
	PAH (18 component mixture): 8-70 mg/kg

# SDI RaPID ASSAY



The SDI RaPID Assay test kits are designed to detect and measure contaminants such as PAH, Total BTEX, TPH, PCB, PCP in soil and water. RaPID Assays also detect and measure pesticides such as atrazine and alachlor, frequently found in rural wells. RaPID Assays are used during site remediation to detect contaminants and monitor the cleanup process. They can also be used to locate wells, map sites, screen lab samples, and monitor industrial processes.

### Rental Includes:

- RPA-I RaPID Analyzer
- 60 Position Magnetic Separator
- Eppendorff Repeating Pipettor
- Digital Balance and Timer
- Eppendorff Adjustable Volume Pipettor
- Vortex Genie

### Sold Separately:

- Reagents for soil and water
- Sample extraction kits
- Pipette tips
- Gloves

*NOTE: Training is required.*

**Rental Includes:**

- HydroScout Digital Hand-Held Analyzer

**Sold Separately:**

- HydroScout reagents
- Gloves

**Specifications:**

<b>Analyte</b>	Water
<b>Matrix</b>	Used Oil, Industrial Oils, Lubricating Oils, Organic Liquids, Soil
<b>Detection Method</b>	Quantitative calcium Hydride reaction
<b>High Range</b>	1500 ppm - 100%
<b>Low Range</b>	50 ppm to 10,000 ppm
<b>Precision</b>	+/- 10% (+50 ppm)
<b>Analysis Time</b>	Less than 10 minutes

# DEXSIL HYDROSCOUT



HydroScout is a field portable test that quantifies water concentration in a variety of matrices, (used oil, industrial oil, lubricating oil, paint, solvents, liquid waste, soil, inks, etc.) HydroScout can quantify water content in a variety of ranges. It is an easy, inexpensive test that can be run in the field at the pickup point or in a laboratory setting with minimal training required. This method is ideal for accurately determining the true water content in used oil before acceptance or treatment and the water content of industrial and lubricating oils.

**Specifications:**

<b>Weight</b>	20 lbs.
<b>X-ray Source</b>	5-position primary beam filters for optimal performance across the periodic table
<b>Detector</b>	High resolution Si PiN diode detector that delivers < 190 eV resolution (FWHM Mn K-alpha line) in a proven, field-rugged package
<b>Operation</b>	Powerful Pentium processor, embedded XP and sealed, field hardened color touch screen
<b>Power</b>	AC Power or 2-3 hours Li-ion battery power

*NOTE: See appendix page 32 for elements/periodic table.*

# X-50 MOBILE XRF



The X-50 Mobile XRF offers a higher level of power and performance not possible in smaller handheld XRF's. Operating at up to 25 times the powers of a handheld XRF, the X-50 is an industrial-grade XRF offering the performance of traditional tabletop XRF systems while maintaining Innov-X Systems signature XRF portability.

## NEVER USED A **DRÄGER PID** BEFORE?



The Dräger Multi-PID 2 is the next generation of reliable photoionization detectors for volatile organic compounds (VOCs). Its innovative PID-technology combines high sensitivity and robustness with suitability for various applications like soil, water or jar headspace screening, leak detection and confined space measurements.

***Book your 1st two week rental of a Dräger PID unit and receive 50% off retail list price.\****

*\* One-time offer to experience a Dräger.*

## SUPPLIES AVAILABLE:

- 500 ml bottles of calibration standards
- DO colorimetric test kit for backup
- pH test strips for back up
- Sample jars
- Gloves
- Calibration gases



***View all equipment and sampling supplies on [www.ospreyscientific.com](http://www.ospreyscientific.com) and [www.enviromeasure.com](http://www.enviromeasure.com)***

*Rental Includes:*

- 0.02, 10.0, and 1000 NTU calibration standards
- Empty cuvettes
- Meter
- Manual
- Spare batteries

*Specifications:*

<b>Measuring Range</b>	NTU: 0 to 1100 FNU: 0 to 1100
<b>Resolution</b>	0.01 NTU from 1 to 9.99 0.1 NTU from 10.0 to 99.9 1 NTU from 100 to 1000
<b>Response Time</b>	14 seconds
<b>Operating Temp.</b>	32 to 122°F (0 to 50°C)

## WTW 355IR TURBIDITY METER



Portable turbidity meter with infrared LED (860 nm) for nephelometric measurements. Lightweight and easy to operate. (calibration standards 0,02 – 10,0 and 1000 NTU).

*Rental Includes:*

- 4 primary standards (0.02, 20.0, 100, and 800 NTU)
- 2 empty cuvettes with light shield
- Spare batteries

*Specifications:*

<b>Range</b>	0 to 1000 NTU
<b>Automatic Range Selection</b>	0 to 19.99 NTU, 20.0 to 99.9 NTU, 100 to 1000 NTU
<b>Resolution</b>	0.01, 0.1, 1
<b>Accuracy</b>	±2% of reading from 0 to 500 NTU, ±3% of reading 500 to 1000 NTU
<b>Response Time</b>	Less than 6 seconds
<b>Operating Temp.</b>	0 to 50°C, 32 to 122°F

## OAKTON T-100 TURBIDITY METER



Designed for portability and turbidity the waterproof T-100 turbidity meter is ideal for monitoring turbidity in chemical, food, and industry applications. The microprocessor-based T-100 turbidity meter uses an infrared LED light source and delivers unprecedented repeatability and accuracy while offering resolution as low as 0.01 NTU.

# OAKTON DO 300 METER



The completely waterproof Oakton DO meter reads dissolved oxygen in mg/L, ppm or % saturation. Perfect for conditions that ruin ordinary dissolved oxygen meters. It automatically calculates barometric pressure and salinity offset values, and it guarantees high accuracy with independent 100%, zero, and offset adjustment capabilities.

**Rental Includes:**

- Dissolved oxygen/temperature probe
- Electrolyte zeroing solution and batteries

**Specifications:**

Mode Range	mg/l (ppm)	% Saturation	Temperature
	0.00 to 20.00	0.0 to 200.0%	0.0 to 50.0°C (32.0 to 122.0°F)
Resolution	0.01	0.1%	0.1°C (0.1°F)
Accuracy	±1.5% full scale	±1.5% full scale	±0.1°C (±0.3°F)
Temp. Compens	Automatic from 0 to 50°C		
Salinity Correction	Range: 0.0 to 50.0 ppt Resolution: 0.1 ppt		
Barometric Pressure Correction	Range: 555 to 808 mm Hg (66.6 to 199.9 kPa) Resolution: 1 mm Hg (0.1 kPa)		
Operating Temp.	0 to 50°C		

# WTW 315i DISSOLVED OXYGEN METER



WTW's rugged handheld DO meter is optimized for durability, accuracy, and ease of use in the field or lab. Waterproof and submersible this meter includes everything you need for DO measurement and calibration. Excellent for surface and ground water monitoring.

**Rental Includes:**

- Dissolved oxygen/temperature probe
- Electrolyte zeroing solution and batteries

**Specifications:**

Measuring Range/Resolution	O2 concentration: 0.00...19.99 mg/l (0.0... 19.9 mg/l*) 0...90.0 mg/l (90 mg/l*) O2 Saturation: 0.0...199.9% (199%*) 0...600% Temperature: -5.0...+50.0°C
Accuracy (±1 digit)	O2 concentration: + 0.5% of value O2 saturation: + 0.5% of value Temperature: + 0.1 C
Temperature Compensation	Automatic 2% at 0...+40 °C
Air Pressure Compensation	Automatic with built in pressure sensor (500...1100 mbar)
Salinity Correction	Automatic at 0 or 35.0 fixed SAL

## Rental Includes:

- Probe
- Rubber protective boot
- Spare batteries

## Sold Separately:

- Calibration standards

## Specifications:

<b>Range/Resolution</b>	0.0 $\mu$ S/cm – 500mS/cm in 5 measuring ranges or AutoRange 0.00 $\mu$ S/cm – 19.99 $\mu$ S/cm (for K=0.1 cm <sup>-1</sup> )
	0.000 $\mu$ S/cm – 1.999 $\mu$ S/cm (for K=0.01 cm <sup>-1</sup> )
<b>Accuracy</b>	$\pm$ 0.5% of value $\pm$ 0.1 K
<b>Operating Temp.</b>	-5°C...+105°C

# WTW 330i CONDUCTIVITY METER

1 SET OF  
SINGLE USE  
CALIBRATION  
SOLUTION IS  
INCLUDED\*



Useable anywhere the WTW conductivity meter is robust, shockproof, and waterproof. This simple conductivity meter has error-free measurement and is an excellent field tool for environmental field testing.

## Rental Includes:

- Probes and spare batteries

## Sold Separately:

- Calibration standards

## Specifications:

<b>Range</b>	<b>pH</b>	-2.00 to 16.00
	<b>Temp</b>	0.0 to 100.0°C
	<b>mV</b>	-2000 to 2000 mV
<b>Resolution</b>	<b>pH</b>	0.01 pH
	<b>Temp</b>	0.1°C
	<b>mV</b>	0.1 mV $\pm$ 199.9 mV: 1 mV beyond $\pm$ 199.9 mV
<b>Accuracy</b>	<b>pH</b>	$\pm$ 0.01 pH
	<b>Temp</b>	$\pm$ 0.5°C
	<b>mV</b>	$\pm$ 0.2 mV $\pm$ 199.9 mV: $\pm$ 2 mV beyond $\pm$ 199.9 mV
<b>Calibration</b>	<b>pH</b>	Up to 5 buffer values 1.68, 4.01, 7.01, 10.01, 12.45
	<b>Temp</b>	Offset 0.1°C increments
	<b>mV</b>	Offset up to $\pm$ 150 mV

# OAKTON pH 300 METER

1 SET OF  
SINGLE USE  
CALIBRATION  
SOLUTION IS  
INCLUDED\*



The OAKTON® pH 300 Meter features:

- Durable waterproof and dustproof design with IP67 rating
- Selectable Manual or Automatic Temperature Compensation for accuracy
- Ideal for dirty, wet environments or food related applications
- Advanced set-up mode for customization

# OAKTON 300 pH/CON METER



1 SET OF  
SINGLE USE  
CALIBRATION  
SOLUTION IS  
INCLUDED\*

A waterproof meter that measures pH, conductivity, TDS and temperature. This meter's advanced setup mode lets you customize meter parameters, recall calibration values for both pH and conductivity (TDS), pH electrode slope/offset, and effective conductivity cell constant per range. It features a superior waterproof and dustproof housing with an IP 67 rating. This meter uses separate probes to let you select specialty probes for different applications.

*Rental Includes:*

- Probes and spare batteries

*Sold Separately:*

- Calibration standards

*Specifications:*

	pH	Conductivity	TDS
<b>Range</b>	-2.00 to 16.00 pH	0-19.99 uS 0-199.9 uS 0-1999 uS 1-19.99 mS 0-199 mS	0.00-9.99 ppm 10.0-99.9 ppm 100-999 ppm 1.00-9.99 ppt 10.0-199.9 ppt
<b>Resolution</b>	0.01 pH	0.01 uS, 0.1uS, 1 uS, 0.01 mS, 0.1 mS	0.01, 0.1, 1 ppm; 0.01, 0.1 ppt
<b>Accuracy</b>	±0.01pH	±1% full scale	±1% full scale

# WTW 340i pH/CON METER



1 SET OF  
SINGLE USE  
CALIBRATION  
SOLUTION IS  
INCLUDED\*

The WTW multi meter is for determining the pH, conductivity and temperature in a field application. It is easy to use and has up to 2500 hours of continuous operation. The meter is hose proof and meets the requirements of IP 57.

*Rental Includes:*

- Probe and spare batteries

*Sold Separately:*

- Calibration standards

*Specifications:*

	pH Measurement	Conductivity Measurement
<b>Range/ Resolution</b>	pH -2.00 to 19.99 mV -1999 to 1999	1 µS/cm to 500 mS/cm in 4 ranges Salinity 0.0 to 70.0
<b>Accuracy (± Digit)</b>	pH ± 0.01 pH mV ± 1 mV	± 1% of value
<b>Temp. Compensation</b>	Automatic -5 to 105°C Manual -20 to 130°C	Non-linear function for ultrapure and natural water to EN 27 888
<b>Ref. Temp.</b>	N/A	20/25°C selectable

## Sold Separately:

- Calibration standards

## Specifications:

<b>Maximum Probe Size</b>	46mm
<b>pH</b>	0 - 14 pH
<b>Dissolved Oxygen</b>	0 -19.99 mg/L
<b>Conductivity</b>	0 - 100 S/m
<b>Salinity</b>	0 - 4%
<b>Total Dissolved Solids</b>	0 - 49.9 g/L
<b>Seawater Specific Gravity</b>	0 - 50
<b>Temperature</b>	0 - 55°C
<b>Turbidity</b>	0 - 800 NTU
<b>Water Depth</b>	0 - 100 m
<b>Oxidation Reduction Potential</b>	± 1999 mV

## HORIBA W-22 MULTIMETER & FLOW CELL



The W-22 Multi-function Water Quality Monitoring System has a 46 mm diameter probe allowing a compact monitoring solution that offers high pressure tolerance, long-term continuous measurement capability and simultaneous analysis of up to 10 parameters. The W-22 features a one step calibration and can be used to measure depths as low as 10m.

## Sold Separately:

- Calibration standards

## Specifications:

<b>pH</b>	0 - 14 pH
<b>Dissolved Oxygen</b>	0 - 50.0 mg/L
<b>Conductivity</b>	0 - 10 S/m (0 - 100 mS/cm)
<b>Salinity</b>	0 - 70 ppt
<b>Total Dissolved Solids</b>	0 - 100 g/L
<b>Seawater Specific Gravity</b>	0 - 50
<b>Temperature</b>	-5 - 55°C
<b>Turbidity</b>	0 - 1000 NTU
<b>Water Depth</b>	0 - 30 m
<b>Oxidation Reduction Potential</b>	± 2000 mV

## HORIBA U-53 MULTIMETER & FLOW CELL



- Intuitive software assures ease of use and operation efficiency.
- Multiple sensors allow for the measurement of 11 parameters simultaneously. (pH, Ph (mV), ORP, DO, EC, Salinity, TDS, Seawater Specific Gravity, Temperature, Turbidity and Water depth)

# WTW MULTI 350i MULTI-PARAMETER



**1 SET OF  
SINGLE USE  
CALIBRATION  
SOLUTION IS  
INCLUDED\***

**WTW's rugged, waterproof handheld multi-parameter meters allow the user to monitor and record several important water quality parameters with one instrument.**

**(pH, ORP, DO, conductivity, ISE, and temperature)**

**Sold Separately:**

- Calibration standards

**Specifications:**

pH Measurement	Oxygen Measurement	Conductivity Measurement
pH -2.00 to 19.999 -2.00 to 19.99	O2 Conc. 0.00 to 19.99 mg/l	LF: 0.0 uS/cm in 5 ranges (AutoRange)
mV -999.9 to 999.9 -1999 to 1999	0.0 to 90.0 mg/l	Additional: 0.00 to 19.99 uS/cm 0.000 to 1.999 uS/cm
Temp -5.0 to 105°C	O2 Sat. 0.0 199.9% 0 to 600%	Temp: -5.0 to 105°C
Conc. 0.01 to 1999 mg/l	O2 P.Press 0.0 to 199.9 mbar 0 to 1250 mbar	Salinity: 0.0 to 70.0
		TDS: 0 to 1999 mg/l
		Spec. resistivity: 0.00 to 1999 MOhm cm

# WATERRA STAINLESS STEEL SUBMERSIBLE PUMP



**The mini monsoon pump is capable of pumping up to 80 feet from ground level by simply connecting it to a 12 volt battery. Its reliable design is suitable for continuous groundwater purging or long term remediation projects. Suitable for harsh environments. Does not require a power booster or controller.**

**Rental Includes:**

- 90 feet of heavy duty 10 gauge wire
- One motor module and wrench

**Specifications:**

- 12 volt
- Length: 7.5"

## Rental Includes:

- DeltaTox II Analyzer

## Sold Separately:

- Reagents
- Gloves

## Specifications:

- Broad range of toxins detected - >2,700 compounds
  - Microbial detection level in drinking water – 100 cfu/mL
  - Excellent correlation with HPC methods
  - Repeatability (Precision): <20% coefficient of variation for B-Tox and Q-Tox mode testing
- Sensitivity and Range: The analyzer can detect photon counts from 0 to 60 million

## SDIX DELTA TOX 2



The DeltaTox II Analyzer is a simple test system for acute toxicity that is ideal for screening for chemical contamination. DeltaTox II technology is based on the widely-used and well-documented Microtox Test System and uses the same specialized strain of luminescent bacteria to provide a direct measurement of the toxicity of a sample and simultaneously detect thousands of potential contaminants. The DeltaTox II Analyzer is portable and is easily used at remote locations, such as reservoirs, storage tanks, or at locations throughout your distribution system.

## Specifications:

<b>Range</b>	0.3-15 FPS (0.1-4.5 MPS)
<b>Accuracy</b>	0.1 FPS
<b>Averaging</b>	True digital running average, (readings taken once per second)
<b>Display</b>	LCD
<b>Sensor</b>	Protected Turbo-Prop propeller with electro-magnetic pickup
<b>Weight</b>	2 lbs
<b>Size</b>	3' to 6' long handle
<b>Material</b>	PVC, anodized aluminum, stainless steel bearing
<b>Power</b>	Internal watch type battery/1 year life
<b>Operating Temperature</b>	0° to 120° F

## GLOBAL WATER FP101 FLOW PROBE



The Global Water Flow Probe is a highly accurate water velocity instrument for measuring flows in open channels and partially filled pipes. The water velocity probe consists of a protected water Turbo Prop positive displacement sensor coupled with an expandable probe handle ending in a digital readout display.

## BARNANT/MASTERFLEX PERISTALTIC PUMP



This variable-speed portable sampling drive operates on internal batteries, 12V car battery, or from an AC outlet. Use in the field for sampling or in the plant as a portable pump. It is ideal for sampling trace organic, pesticides, and heavy metal pollution.

### Rental Includes:

- Pump head
- A/C adapter with 12' cord

### Sold Separately:

- High performance PVC tubing

### Specifications:

<b>Dimensions</b>	29 (w) x 41 (h) x 27 (d) cm 11.3" (w) x 16" (h) x 10.5" (d) in
<b>Weight</b>	7.5 kg (16.5 lbs)
<b>Rpm</b>	1 to 400
<b>Speed Control</b>	+/- 10%
<b>Power</b>	115 VAC (50/50 Hz)
<b>Motor Size</b>	1/50 hp (15W)
<b>IP Rating</b>	IP22

## WATERRA HYDROLIFT II



The Waterra Hydrolift II is an electrically powered mechanical drive mechanism which pumps water by repeatedly lifting and dropping a tubing and footvalve assembly that is extended below the water surface in a well. This drive mechanism includes a sliding post that extends beyond the pump body and supports the tubing clamp arm.

### Rental Includes:

- Extension cord
- Ratchet belt

### Sold Separately:

- Polyethylene or Teflon tubing (1" OD, 5/8" OD and 1/2" OD)
- Foot valves
- Also available for rent; power inverter and cables

## Rental Includes:

- Cleaning kit and spare battery

## Specifications:

- Slim 5/8-inch (13mm) field replaceable stainless steel probe
- Able to measure product layer as thin as 1/200ft (1mm)
- Detects and measures LNAPL and DNAPL
- Easy to read accurate (ASME Standard) Kynar® jacketed tape with stainless steel conductors. Graduation 1/100 ft (1mm)
- Heavy-duty tape with a breaking load over 300Lbs

## HERON INTERFACE METER



**Certified intrinsically safe the Heron interface meter is used to measure the thickness of floating or sinking hydrocarbon products in groundwater accurately, reliably, safely and economically.**

**Available in 30m or 60m lengths with 3/4" probe.**

## Rental Includes:

- Cleaning kit and spare battery

## Specifications:

- Unbreakable Polycarbonate reels
- Durable polyester powder coated steel frame
- Corrosion resistant stainless steel fittings
- Soft grip vinyl frame handle
- Large ergonomic brake and winding handles
- Water and dust proof encapsulated electronics
- Strong and accurate NTS certified tape with stainless conductors
- Full depth Stainless Steel and Teflon® probe

## HERON WATER LEVEL METER



**HERON water level meters are designed and built by field engineers and hydro geologists that are rugged, reliable and user friendly.**

**Available in 30m or 60m lengths with 3/4" probe.**

## SOLINST TLC METER



1 SET OF  
SINGLE USE  
CALIBRATION  
SOLUTION IS  
INCLUDED\*

The TLC Meter displays accurate measurements of conductivity and temperature on an LCD display that rotates for reading convenience. Water level and probe depth measurements are read off the accurate flat-tape marked each 1/100 ft. or millimeter. The tape is housed on a standard reel.

Available in 30m length with 3/4" probe.

### *Sold Separately:*

- Calibration standards

### *Specifications:*

- Accuracy as good as +/-2% of readings
- Convenient reel and accurate tape
- Display that rotates for easy reading
- Standard 9V alkaline battery gives 90 hours
- Auto-Off after 4 minutes

### *Applications:*

- Profiling
- Conductivity/temperature in wells and open water
- Salt-water intrusion investigation
- Water quality impairments from road salt
- Tracer tests
- General indication of chemical contamination level
- Early warning of changes in water quality

## SOLINST WATER LEVEL METER



For measuring the depth of water in wells, boreholes, and standpipes. It is easy to operate and read to 1/100ft or to each millimeter.

Available in 30m lengths with 3/4" probe

### *Rental Includes:*

- Cleaning kit
- Spare battery

### *Specifications:*

- Markings each 1/100 ft or millimeter
- Traceable to national standards
- Sensitivity adjustable to conductivity
- Shielded probes to avoid false readings
- Non-stretch stainless steel conductor

**Rental Includes:**

- Comes complete with the levellogger data communication package

**Features:**

- Self-test capability
- Backward compatible
- Maintenance-free, water-tight design
- Protected from power surges, such as lightning
- Real-time viewing; data can be exported
- User-selectable, 30 line sampling schedule

## SOLINST LEVELLOGGER GOLD



The Levellogger is a water level and temperature recording device that combines a datalogger, 10-year battery, pressure transducer and temperature sensor, in a small, minimal maintenance, 7/8" x 6" (22 mm x 154 mm) stainless steel housing. The sealed Faraday cage design greatly simplifies maintenance and provides protection against electrical spikes caused by lightning.

**Rental Includes:**

- Comes complete with V2.03 Software and communications cables

**Specifications:**

- Easy read screen
- High accuracy real-time clock
- Backwards compatible
- Stores 10 personalized logging set-ups
- 8MB non-volatile FLASH memory

## SOLINST USB LEVELLOADER



The 3001 USB Levelloader II is an advanced data transfer unit designed to store and transfer more data, more rapidly, from all Levellogger models, using V2.03 Software. It allows more functionality. You can reprogram Levellogger sampling regimes, altitude and instrument location. It offers the option of password protection and holds up to 380,000 data points (or 256 log files).

## SOLINST BAROLOGGER GOLD



The most accurate method of obtaining changes in water level is to compensate for atmospheric pressure fluctuations using a Barologger. The Barologger Gold uses algorithms based on air rather than water pressure, which gives superior accuracy.

### Specifications:

- Operational temp. range: 20oC to 80oC
- Diameter: 7/8"
- Length: 6"
- Housing Material: Stainless Steel
- Memory: 40 000 g level & temp.
- Measurement Type: Linear, Event & User Selectable
- Accuracy (typical): 0.05% net f.s.
- Accuracy (max. error): 0.1% net f.s.
- Temp. Accuracy: +/- 0.05oC
- SDI-12 compatible, up to 1500 ft (450 m)
- User-selectable, 30 line sampling schedule

**NOTE:** The Barologger rents with the Levellogger and Levellogger Communications Package

## HERON DIPPERLOG

*Groundwater Data Logger*



The Heron dipperLog is the answer to your long term groundwater level monitoring program. The dipperLog measures, records and charts groundwater levels and temperatures over long periods of time.

The Heron dipperLog is a high resolution, accurate (0.05% F.S.) datalogger.

Recording intervals are selected by the user and can range from 1 second to 255 hours.

### Rental Includes:

- Data logger communication package and CD

### Specifications:

- Automatic elevation adjustment with short term static barometric compensation
- Long term automatic barometric compensation with the Heron barLog
- Real time reading of height of water and temperature
- Rapid real time reading (10 measurements / sec) with text and graphing
- Compatible with the Heron dipperWave wireless remote reading system
- Easy field recalibration

*Rental Includes:*

- 10.6eV lamp
- Zero filter
- Probe tip
- Hydrophobic filter/water trap
- Charger and batteries

*Sold Separately:*

- Calibration gas
- Tubing

*Specifications:*

Range	Resolution	Response Time	Accuracy
0 - 999 ppm	0.1 ppm	<3 seconds	+/-2 ppm or 10% of reading <2000 ppm
100 - 10,000 ppm	1 ppm	<3 seconds	+/-20% of reading >2000 ppm

**RAE SYSTEMS  
MiniRAE 2000**

**SUPPLIED BY REQUEST:**  
Demand flow regulator and tubing



The rugged MiniRAE 2000 is a pumped handheld volatile organic compound (VOC) monitor. Its Photoionization Detector's (PID) extended range of 0 to 10,000 ppm makes it an ideal instrument for applications on environmental sites.

*Rental Includes:*

- 10.6eV lamp
- Probe tip
- Hydrophobic filter/water trap
- Charger with batteries

*Specifications:*

<b>Calibration</b>	Calibrated to 100 ppm isoutylene
<b>Ambient Conditions</b>	Temperature 0 to 40 °C, 32 to 105 °F Humidity 0 to 95 %RH, not condensing
<b>Approvals</b>	ATEX II 2G EEX ib IIC T4; 0 ≤Ta≤ +70 oC EMTE:A MRT: Class I, Div 1, Group A, B, C, D, T4. CE-mark electromagnetic compatibility (directive 89/336/EEC)
<b>Battery</b>	Rechargeable, field changeable NiMH Batter pack, up to 8 hours operation
<b>Dimensions &amp; Weight</b>	230 x 110 x 80 mm, width at handle 67 mm; 9" x 4.25 " x 3, width at handle 2.6; 860 g; 1.9 pounds

**DRÄGER MULTI-PID2+**  
*Handheld VOC Monitor*

**SUPPLIED BY REQUEST:**  
Demand flow regulator and tubing



The Dräger Multi-PID 2 is the next generation of reliable photo ionization detection for volatile organic compounds (VOCs). Its innovative PID-technology combines high sensitivity and robustness with suitability for various applications like soil, water or jar headspace screening, leak detection and confined space measurements.

## RKI EAGLE 2

Portable Monitor



**SUPPLIED BY REQUEST:**  
Demand flow regulator and tubing

Unique EAGLE 2 features include PPM or LEL hydrocarbon detection at the push of a button; infrared sensors for CO<sub>2</sub>, methane or hydrocarbons in LEL and % volume ranges; PID sensor for detecting low ppm levels of VOC Gases; methane elimination feature for environmental applications. The EAGLE 2 has a strong internal pump with a low flow auto shut off and alarm, which can draw samples from up to 125 feet. This allows for quick response and recovery from distant sampling locations.

**Rental Includes:**

- Probe
- Extension hose
- Regulator
- Shoulder strap
- Charger and batteries

**Sold Separately:**

- Calibration gas

**Specifications:**

<b>Detection Principle</b>	Catalytic combustion, electrochemical cell, galvanic cell, infrared, PID & TC.
<b>Operating Temp.</b>	-20 ~ 50°C (-4 to 122°F), 0 to 95% RH (non-condensing)
<b>Accuracy</b>	Maximum variance +/- 5% of full scale

## RKI EAGLE

Portable Monitor



**SUPPLIED BY REQUEST:**  
Demand flow regulator and tubing

The most versatile portable gas detector. Unique features include PPM or LEL hydrocarbon detection at the push of a button; infrared sensors for CO<sub>2</sub>, methane or isobutane in LEL and % volume ranges; a methane elimination switch for environmental applications, and dual hydrophobic filters that increases water resistant performance. A strong internal pump with a low flow auto shut off and alarm, which can draw samples from up to 125 feet.

**Rental Includes:**

- Probe
- Shoulder strap
- Charger and batteries

**Sold Separately:**

- Calibration gas

**Specifications:**

<b>Hydrocarbons</b>	<b>Detectable Ranges</b>
<b>Oxygen</b>	0 - 100% LEL, 0 - 50,000ppm
<b>Carbon Monoxide</b>	0 - 40% volume
<b>Hydrogen Sulfide</b>	0 - 500ppm
	0 - 100 ppm
<b>Operating Conditions</b>	-10° C to 40° C / 14° F to 104° F, 0 to 95% RH, non-condensing
<b>Detection Principle</b>	Catalytic combustion and electrochemical cell
<b>Battery</b>	18 hours using rechargeable Ni-Cads

**Rental Includes:**

- Monitor and charger

**Sold Separately:**

- Calibration gas

**Specifications:**

	EX (%LEL)	O2 (Vol.%)	CO (ppm)	H2S (ppm)
<b>Detection Range</b>	0 ~ 100	0 ~ 25	0 ~ 2000	0 ~ 200
<b>Reaction Time</b>	< 8 sec.	< 6 sec.	< 6 sec.	< 6 sec.
<b>Measuring Accuracy</b>	< 5%	< 1%	< 2%	< 2%
<b>Temperature Influence</b>	0.1% LEL/K	<0.2% vol.	No Effect	<5 ppm
<b>Dimensions &amp; Weight</b>	48 (w) x 130 (h) x 44 (d) mm Approx. 220 to 250 g			
<b>Operating Temp &amp; Humidity</b>	-20 ~ 50°C, 700 ~ 1300hPa, 10 to 95% RH			
<b>Continuous Operation</b>	Up to 12 hours			

**DRÄGER X-am 2000**  
*Personal Gas Monitor*

**SUPPLIED BY REQUEST:**  
Calibration cradle and demand flow regulator



The Dräger X-am 2000 is a gas detector specially designed for personal monitoring use. The 1-to-4 gas detector reliably measures combustible gases and vapors, as well as O2, CO and H2S. Its ergonomic design and low weight make it the perfect rental.

**Rental Includes:**

- Monitor and charger

**Sold Separately:**

- Calibration gas

**Specifications:**

	EX (%LEL)	O2 (Vol.%)	CO (ppm)	H2S (ppm)
<b>Detection Principle</b>	Catalytic combustion	Galvanic cell	Electro-chemical cell	Electro-chemical cell
<b>Detection Range</b>	0 ~ 100	0 ~ 40	0 ~ 500	0 ~ 100
<b>Preset Alarms</b>	1st/10% 2nd/50% Over/100%	Low/19.5% High/23.5% Over/40%	1st/25 ppm 2nd/50 ppm TWA/25 ppm STEL/400 ppm	1st/10 ppm 2nd/30 ppm TWA/10 ppm STEL/100 ppm
<b>Operating Temp. &amp; Humidity</b>	-10 ~ 40°C(14 to 104°F), 0 to 85% RH (non-condensing)			
<b>Response Time</b>	Within 30 seconds (T90)			

**RKI GX-2001**  
*Personal Gas Monitor*

**SUPPLIED BY REQUEST:**  
1 calibration boot and flow regulator



Weighing only 6 ounces and about the size of a pager, the GX-2001 simultaneously monitors combustibles, oxygen, carbon monoxide, and hydrogen sulfide. The GX-2001 is armed with standard features like auto-calibration, data-logging, rechargeable Ni-Cad batteries and charger, a unique vibration alarm, STEL / TWA readings, peak hold and auto backlighting at alarm on a large LCD display, and it even tells the time.

## RKI GX-2003 Personal Gas Monitor



**SUPPLIED BY REQUEST:**  
Demand flow regulator and tubing

The GX-2003 is a personal 5-in-1 gas monitor with a built in sample pump. It can monitor the standard confined space gases (LEL combustibles, Oxygen deficiency, Carbon Monoxide, and Hydrogen Sulfide), however it can also measure 100% volume combustibles and dynamically display either % LEL, or % volume with its auto-ranging ability. Standard alarm types include vibration, visual, and audible alarms that can be set to latching or non-latching.

**Rental Includes:**

- Attachment hose and probe
- Protective rubber boot
- Probe tip
- Charger

**Sold Separately:**

- Calibration gas

**Specifications:**

	ALL (%LEL)	EX (Vol.%)	O2 (Vol.%)	CO (ppm)	H2S (ppm)
<b>Detection Range</b>	0 ~ 100	0 ~ 100	0 ~ 40	0 ~ 500	0 ~ 100
<b>Sampling Method</b>	Internal sample pump, flow rate nominal 0.5 LPM				
<b>Types of Alarms</b>	Gas alarm: flashing lights, intermittent buzzer, and vibration Trouble alarm: Blinking LEDs intermittent buzzer, display of error message				

## RKI GX-2009 Personal Gas Monitor



**SUPPLIED BY REQUEST:**  
Demand flow regulator and tubing

The smallest and lightest 4-gas monitor weighing only 4.6 ounces. The GX-2009 simultaneously monitors and displays combustibles, oxygen, carbon monoxide, and hydrogen sulfide. Dual audible alarm ports and alarm LED's on 3 sides of the instrument, so that alarm conditions are obvious from multiple perspectives especially in high noise environments. Other features include a waterproof and dustproof design with IP 67 rating, an impact resistant rubber over-mold body that is RFI resistant, and a large capacity data logging system feature.

**Rental Includes:**

- Monitor and charger

**Sold Separately:**

- Calibration gas

**Specifications:**

	EX (%LEL)	O2 (Vol.%)	CO (ppm)	H2S (ppm)
<b>Detection Principle</b>	Catalytic combustion	Galvanic cell	Electro-chemical cell	Electro-chemical cell
<b>Detection Range</b>	0 ~ 100	0 ~ 40	0 ~ 500	0 ~ 100
<b>Operating Temp &amp; Humidity</b>	-10 ~ 40°C (14 to 104°F), 0 to 85% RH (non-condensing)			
<b>Response Time</b>	Within 30 seconds (T90)			

**ALL ENVIRONMENTAL AND PERSONAL SAFETY MONITORS HAVE TUBING AND GAGE REGULATORS AVAILABLE BY REQUEST**



Gas for calibration can be purchased for daily bump testing of personal safety monitors and long term environmental monitors.

**SOIL SAMPLE BAGS ARE AVAILABLE FOR PURCHASE IN QUANTITIES OF 25, 100 AND 500**



Two bags will be included with the rental of a PID or Eagle.

**ALL PH METERS COME WITH ONE 3-POINT CALIBRATION, RINSE, GLOVES AND SAMPLE JAR**



**SINGLE USE**

pH 4/7/10 available in 500 ml bottles and single packs of 20 or mixed pack of 5 pH 4, 5 pH 7, 5 pH 10 & 5 rinse solution.

**ALL CONDUCTIVITY METERS COME WITH 1 CALIBRATION 1413  $\mu$ S STANDARD AND RINSE, GLOVES AND SAMPLE JAR**



**SINGLE USE**

1413  $\mu$ S available in 500 ml bottles and single packs of 20.

## SERVICE

### SERVICE FOR PORTABLE GAS DETECTION EQUIPMENT

- Personal Protective and environmental monitoring
- Cleaning, evaluation of operating systems (such as pump, batteries & sensors) and calibration to ensure proper response
- We stock most replacement parts, filters and calibration supplies

#### *How often should I calibrate my gas monitor?*

The only way to know the readings are accurate is to expose the instrument to a standard of a known concentration on a regular basis. We recommend that instruments be bump tested daily with calibration gas. As long as the instrument response is within specification, then no calibration is required. If the response is outside the limits, then recalibrate.

### WATER SAMPLING / WATER QUALITY METERS

- Servicing includes cleaning and inspection, probe maintenance, performance evaluation and calibration
- Electrode cleaning and reconditioning
- Dissolved oxygen membrane replacement
- Link and probe repairs on water level and interface meters
- Repair corroded or broken connectors

#### *Does field temperatures affect my pH?*

Yes, because temperature affects the concentration of hydrogen ions, which is what in turn affects pH values. Minimization of this error can be achieved by calibration in buffers near the same temperature as the sample.

### OTHER SERVICES

- Re-build / service for variety of pumps
- Dräger Fit testing
- On site service (call for details)
- Equipment maintenance & calibration training
- Over the phone technical support / troubleshooting

*Call for pricing and service packages for all of your environmental monitoring equipment.*

## TECHNICAL TRAINING

### ENVIRONMENTAL FIELD ANALYTICS COURSES

Essential training for environmental professionals (novice to experienced) and field analysts. Formerly presented by Osprey Scientific, Enviro Measure Inc. now presents the same material with specialties in field analytics. Learn more about the equipment vital to any remediation projects, environmental assessments and compliance monitoring programs.

#### *Introduction to Field Analytics*

#### *Data Quality Objectives*

#### *Sampling Strategies*

#### *Measurement Technologies*

#### *Inorganic Chemical Characterization*

#### *Organic Field Characterization*

#### *Volatile/ Semi-Volatile Organic Contaminates*

#### *Waste Characterization*

- Become more familiar with technologies, both new and established
- Gain a competitive edge by providing client cost efficiencies and higher confidence in decision making, particularly with compliance issues
- Understand equipment to obtain quality data.
- Experienced instruction in theory & practical hands-on sessions to see how to run test kits and understand meter operation, calibration & maintenance.

*See Our Website for Detailed Outline and Upcoming Dates in Your Area.*

[www.ospreyscientific.com](http://www.ospreyscientific.com)

[www.enviromeasure.com](http://www.enviromeasure.com)

### CUSTOMIZED EQUIPMENT OPERATION, CALIBRATION & MAINTENANCE COURSES

Beneficial training for those who rent or own equipment used in field work. Get the most out of your investment! Requisite information for introduction of new equipment and for companies with junior field technicians.

- Gain confidence in equipment use and care.
- Minimize errors due to poor data or repeat field trips
- Save money by learning to properly maintain equipment
- Prevent failure in the field and company equipment abuse
- Develop consistent operating procedures

*Training can be provided at your facility or ours.*

### SPECIALIZED APPLICATION SPECIFIC COURSES

For those interested in our Environmental Field Analytics course, but work in a specific industry or have special sampling & monitoring needs. Training can be highly detailed and geared to group knowledge level.

- Be consistent and add value to employee job satisfaction
- Obtain quality data; minimize errors and increase confidence in decision making
- Have the option to train on specific sections of the Environmental Field Analytics course and focus only on what is beneficial to you
- Options range from 1 day to 5 full days depending on your needs
- Be able to implement your own internal protocols along with basic instrument training
- Industry or company specific compliance
- Reporting requirements for special projects

*Call for pricing and personalized course designs.*

**pH MEASUREMENT:** pH measurement is used in a wide variety of applications: agriculture, wastewater treatment, industrial processes, environmental monitoring, and in research and development. pH is a measure of the acidity or alkalinity of a solution. The pH value states the relative quantity of hydrogen ions ( $H^+$ ) contained in a solution. The greater the concentration of  $H^+$  the more acidic the solution and the lower the pH. In this relationship, pH is defined as the negative logarithm of hydrogen activity. A standard pH measuring system consists of three elements: 1) pH electrode; 2) temperature compensation element and 3) pH meter or controller.

*Finding the value for pH is essential in determining an important characteristic of a solution.*

So, pH is just a unit to represent one characteristic of a solution, just as the meter is a unit of length. Measuring pH is also as the first step toward managing chemical reactions. Currently, pH measurement is used in various fields, including nearly all industries that deal with water, not only the chemical industry, but public organizations, agriculture and fishery-related industries and biological industries, as well.

#### **pH VALUES OF COMMON SUBSTANCES:**

##### **BASIC**

pH - 14 - household lye  
pH - 12.8 - bleach  
pH - 11.3 - ammonia  
pH - 8.5 - baking soda  
pH - 7.5 - pool water

##### **NEUTRAL**

pH - 7.0 - distilled water

##### **ACIDIC**

pH - 5.8 - rain water  
pH - 4.5 - orange juice  
pH - 3.0 - vinegar  
pH - 2.5 - Coca-Cola™  
pH - 2.0 - lemon juice  
pH - 0.5 - battery acid

#### **pH SIGNIFICANT LEVELS:**

pH - CDWG: 6.5 - 8.5  
pH - CCME Freshwater Aquatic Life: 6.5 - 9.0  
pH - 3.0 - 3.5 - Fish survive only hours  
pH - 4.0 - 4.5 - All fish, most frogs, and insects absent  
pH - 6.5 - 8.2 - Optimal for most organisms  
pH - 9.0 - 10.5 - Harmful to salmonids and perch  
pH - 10.5 - 11.0 - Lethal to salmonids  
pH - 11.0 - 11.5 - Rapidly lethal to all species of fish

**ELECTRODE CONDITIONING:** 1. Remove the protective cap from the bottom of the sensor, and rinse the electrode with distilled or deionized water. 2. Place the electrode in a beaker of one of the following liquids for one hour to rehydrate the electrode. The liquids listed below are in the order of their ionic ability to condition the electrode.

A. KCl (potassium chloride) 3.8 or 4.0 molar    B. Tap water    C. 4.0 pH buffer    D. 7.0 pH buffer

**NOTE:** *Never condition a pH electrode in distilled or deionized water. Long term exposure of the glass electrode to pure water will damage the glass by leaching pH sensitive elements out of the glass.*

3. After one hour of conditioning the sensor, rinse the electrode with distilled or deionized water. You are now ready to calibrate with buffers and take measurements.

**ELECTRODE STORAGE:** Once measurements have been made, the electrode should be stored in a manner which will keep the bulb of the electrode moist or hydrated.

A. The protective cap of the electrode can be used to hold a small amount of liquid. Add a few drops of potassium chloride or 4.0 pH buffer to the cap or rubber boot, then place the cap on to the electrode. This method works for long and short term storage.

B. The electrode can be placed in a beaker of either potassium chloride, 4.01 pH buffer, 7.00 pH buffer or tap water for short term storage.

C. For pHTestrs, place a small piece of sponge or paper towel in the bottom of the cap. Wet the sponge or paper towel with potassium chloride, tap water or pH 4.0 buffer and replace the cap.

**Solutions which cannot be measured with General Purpose Electrodes:** Heavy Metals, Proteins, Organics, Low Ion Solutions (DI water), High Sodium, Sulfides, Tris Buffers

If a sample contains any of these contaminants, the pH electrode may work for only a very short period of time before it fails to operate at all. Reconditioning may restore the electrode to a useful condition but the same short term usage may occur if it is to be used in the same sample again. If a sample contains any of these contaminants, the customer should look at other electrode combinations which are more compatible with the solutions to be measured.

*The proper control of water quality is an essential part of any successful aquaculture operation. Immediate test results provided by on-site water analysis equipment can confirm a healthy environment or give early warning signals for required treatment.*

**ALKALINITY:** Composed primarily of carbonate ( $\text{CO}_3^{2-}$ ) and bicarbonate ( $\text{HCO}_3^-$ ), alkalinity acts as a stabilizer for pH. Alkalinity, pH and hardness affect the toxicity of many substances in the water.

**AMMONIA:** Ammonia, present in both ionized ( $\text{NH}_4^+$ ) and unionized ( $\text{NH}_3$ ) forms, is extremely toxic to fish in the unionized form. Even low levels of un-ionized ammonia may affect the fish's central nervous system, reduce its ability to obtain oxygen and lowers resistance to disease. A product of organic waste, ammonia enters the water directly from the fish and from other organic material and uneaten food. Ammonia levels are pH dependent, and can fluctuate throughout the day.

**CARBON DIOXIDE:** Different species of fish have different susceptibilities to carbon dioxide toxicity. In some species, excess carbon dioxide hinders the ability of the blood to hold oxygen. Produced during respiration and consumed during photosynthesis, carbon dioxide levels fluctuate throughout the day opposite to dissolved oxygen levels. High carbon dioxide levels lower the pH, which in turn affects the ration of un-ionized to ionized ammonia.

**CHLORIDE:** Chloride levels can affect fish health in two ways; as the major constituent of salinity or as a treatment to prevent nitrite toxicity. In systems with existing or chronic high nitrite levels, chloride will often be added to prevent the fish from succumbing to nitrite toxicity.

**CONDUCTIVITY:** measures the ability of a solution to conduct an electric current between two electrodes. In solution, the current flows by ion transport. Therefore, with an increasing amount of ions present in the liquid, the liquid will have a higher conductivity. If the number of ions in the liquid is very small, the solution will be "resistive" to current flow. AC current is used to prevent complete ion migration to the two electrodes.

**COPPER:** Copper, in the form of copper sulfate, is often used in aquaculture systems as an algicide and bactericide, however high levels can be toxic to fish. High pH and alkalinity levels will complex copper, helping to reduce its toxicity.

**DISSOLVED OXYGEN:** The dissolved oxygen test is one of the most important in aquaculture. Dissolved oxygen levels can affect fish respiration, as well as ammonia and nitrite toxicity. Salinity and temperature are both factors that affect dissolved oxygen levels.

**HARDNESS:** Total hardness is defined as the concentration of calcium ( $\text{Ca}^{2+}$ ) and magnesium ( $\text{Mg}^{2+}$ ) in the water. Closely related to alkalinity and pH, sufficient hardness levels can decrease ammonia and pH toxicity. Calcium is also necessary for proper egg and fry development.

**NITRITE:** Formed as an intermediate product between ammonia and nitrate in the nitrification process, nitrite ( $\text{NO}_2^-$ ) is extremely toxic to fish. High nitrite levels, combined with low chloride and dissolved oxygen concentrations, may result in methemoglobinemia, better known as brown blood disease.

**pH:** One of the most common water, tests, pH is a measure of the acidity or basicity of the water. The pH scale is logarithmic, and runs from 0 to 14; 7.0 is considered neutral with those values less than 7 being acidic and those above 7 basic. The greatest concern with pH is how it affects the toxicity of many other substances, including nitrite and ammonia.

**PHOSPHATE (PHOSPHOROUS):** Phosphates enter the water supply from many sources, including agricultural runoff and sewage. Although phosphorous is an essential nutrient for bone formation and is a primary ingredient in fertilizers, excessive levels can promote an overabundance of algae.

**TEMPERATURE:** In an established system the water temperature controls the rate of all chemical reactions, and affects fish growth, reproduction and immunity. Drastic temperature changes can be fatal to fish.

Oxygen is critical to the survival of aquatic plants and animals, and a shortage of dissolved oxygen is not only a sign of pollution, it is harmful to the fish. Some aquatic species are more sensitive to oxygen depletion than others, but some general guidelines to consider when analyzing test results are:

- 5 – 6 ppm Sufficient for most species
- <3 ppm Stressful to most aquatic
- 2 < ppm Fatal to most species

Because of its importance to the fish's survival, aquaculturists or "fish farmers", and aquarists use the dissolved oxygen test as a primary indicator of their system's ability to support healthy fish.

### *Where does the oxygen come from?*

The oxygen found in water comes from many sources, but the largest source is oxygen absorbed from the atmosphere. Wave action and splashing allows more oxygen to be absorbed into the water. A second major source of oxygen is aquatic plants, including algae: during photosynthesis plants remove carbon dioxide from the water and replace it with oxygen.

**ABSORPTION:** Oxygen is continuously moving between the water and surrounding air. The direction and speed of this movement is dependent upon the amount of contact between the air and water. A tumbling mountain stream or windswept, wave covered lake, where more of the water's surface is exposed to the air, will absorb more oxygen from the atmosphere than a calm, smooth body of water. This is the idea behind aerators; by creating bubbles and waves the surface area is increased and more oxygen can enter the water.

**PHOTOSYNTHESIS:** In the leaves of plants, one of the most important chemical processes on Earth is constantly occurring – photosynthesis. During daylight, plants constantly take carbon dioxide from the air, and, in the presence of water, convert it to oxygen and carbohydrates, which are used to produce additional plant material. Since photosynthesis requires light, plants do not photosynthesize at night, so no oxygen is produced. Chemically, the photosynthesis reaction can be written as:



### *Where Does The Oxygen Go?*

Once in the water, oxygen is used by the aquatic life. Fish and other aquatic animals need oxygen to breathe or respire. Oxygen is also consumed by bacteria to decay, or decompose, dead plants and animals.

**RESPIRATION:** All animals, whether on land or underwater, need oxygen to respire, and grow and survive. Plants and animals respire throughout the night and day, consuming oxygen, and producing carbon dioxide which is then used by plants during photosynthesis.

**DECOMPOSITION:** All plant and animal waste eventually decomposes, whether it is from living animals or dead plants and animals. In the decomposition process, bacteria use oxygen to oxidize, or chemically alter, the material to break it down to its component parts. Some aquatic systems may undergo extreme amounts of oxidation, leaving no oxygen for the living organisms, which eventually leave or suffocate.

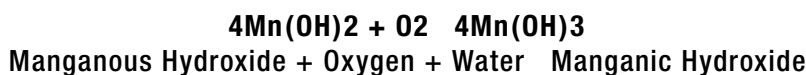
**OTHER FACTORS:** The oxygen level of a water system is not only dependent on production and consumption. Many other factors work together to determine the potential oxygen level, including:

- Salty vs. fresh water: Fresh water can hold more oxygen than salt water.
- Temperature: Cold water can hold more oxygen than warm water.
- Atmospheric pressure (Altitude): The greater the atmospheric pressure, the more oxygen the water will hold.

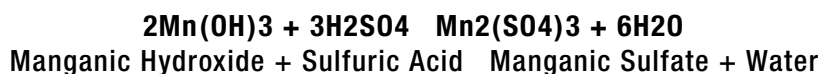
**TESTING DISSOLVED OXYGEN:** Dissolved Oxygen is often tested using the Azide modification of the Winkler method. When testing dissolved oxygen, it is critical not to introduce additional oxygen into the sample. Many people avoid this problem by filling the sample bottle all the way and allowing the water to overflow for one minute before capping. The first step in a DO titration is the addition of Manganous sulfate Solution (4167) and Alkaline Potassium Iodide Azide Solution (7166). These reagents react to form a white precipitate, or floc, of manganous hydroxide, Mn(OH)<sub>2</sub>. Chemically, this reaction can be written as:



Immediately upon formation of the precipitate, the oxygen in the water oxidizes an equivalent amount of the manganous hydroxide to brown-coloured manganic hydroxide. For every molecule of oxygen in the water, four molecules of manganous hydroxide are converted to manganic hydroxide. Chemically, this reaction can be written as:



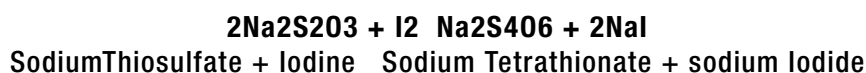
After the brown precipitate is formed, a strong acid, such as Sulfamic Acid Powder (6286) or Sulfamic Acid, 1:1 (6141) is added to the sample. The acid converts the manganic hydroxide to manganic sulfate. At this point the sample is considered “fixed” and concern for additional oxygen being introduced into the sample is reduced. Chemically, this reaction can be written as:



Simultaneously, iodine from the potassium iodide in the Alkaline Potassium Iodide Azide Solution is oxidized by manganic sulfate, releasing free iodine into the water. Since the manganic sulfate for this reaction comes from the reaction between the manganous hydroxide and oxygen, the amount of iodine released is directly proportional to the amount of oxygen present in the original sample. The release of free iodine is indicated by the sample turning a yellow-brown colour. Chemically, this reaction can be written as:



The final stage in the Winkler titration is the addition of sodium thiosulfate. The sodium thiosulfate reacts with the free iodine to produce sodium iodide. When all the iodine has been converted, the sample changes from yellow-brown to colourless.



**CONDUCTIVITY MEASUREMENT TIPS:**

1. For greatest accuracy, ensure that no particulate matter is suspended in the test solution. If necessary, filter or allow particles to settle.
2. Ensure that no air bubbles are trapped in the cell when making measurements.
3. Ensure that the cell plates are completely immersed in the test solution.
4. Do not immerse the cell to the very bottom of the sample container if there is any possibility of a sedimentary layer existing there.
5. Ensure that the cell plates are thoroughly rinsed in deionized water when the cell is removed from solution. Leaving the cell immersed in deionized water is the preferred method for short-term storage.
6. Although it is not critical to store the conductivity cell with the plates in a wetted condition, if they are allowed to dry out completely, it may take some minutes for stability to be achieved upon usage as the plates become wetted.
7. Ensure that no deposits of dried salts or particulate matter are allowed to build up around the cell plates or on the body of the cell. This may produce a conductivity path lower than that through the solution.
8. Glass bodied cells must be used for solvents and strong acid or alkaline solutions.
9. Standard units and cells are calibrated to a reference temperature of 25 deg C.

**What is Conductivity?**

Conductivity (or specifically electrolytic conductivity) is defined as the ability of a substance to conduct electric current. It is the reciprocal of the more commonly encountered term, resistivity. All substances possess conductivity to some degree, the amount varies widely, ranging from extremely low (insulators such as benzene, glass) to very high (silver, copper, and metals in general). Most industrial interest is in the conductivity measurement of liquids, which generally consist of ionic compounds dissolved in water. These solutions have conductivities approximately midway between insulators and metallic conductors. This conductivity can be measured quite easily by electronic means, and this offers a simple test which can tell much about the quality of the water, or the makeup of the solution. A broad line of conductivity equipment is available to measure liquids ranging from ultrapure water (low conductivity) to concentrated chemical streams (high).

**UNITS OF CONDUCTIVITY:** The units of measurement used to describe conductivity and resistivity are quite fundamental and are frequently misused. Once the units are known, various waters can be quantitatively described.

The basic unit of resistance is the familiar ohm. Conductance is the reciprocal of resistance, and its basic unit is the siemens, formerly called mho. In discussions of bulk material, it is convenient to talk of its specific conductance, now commonly called its conductivity. This is the conductance as measured between the opposite faces of a 1-cm cube of the material. This measurement has units of siemens/cm. The units microsiemens/cm ( $\mu\text{S}/\text{cm}$ ) and millisiemens/cm ( $\text{mS}/\text{cm}$ ) are most commonly used to describe the conductivity of aqueous solutions. The corresponding terms for specific resistance (or resistivity) are ohm-cm ( $\Omega\text{-cm}$ ), megaohm-cm ( $\text{M}\Omega\text{-cm}$ ) and kilohm-cm ( $\text{k}\Omega\text{-cm}$ ).

Users of ultrapure water prefer to use resistivity units of  $\text{M}\Omega\text{-cm}$ , because measurement in these units tends to spread the scale out in the range of interest. These same users frequently use  $\text{k}\Omega\text{-cm}$  when dealing with less pure water such as tap water. Others, however, use the units of  $\Omega\text{S}/\text{cm}$  and  $\text{mS}/\text{cm}$  when dealing with any stream from quite pure to very concentrated chemical solutions. In these applications, the use of conductivity has the advantage of an almost direct relationship with impurities, especially at low concentration. Hence, a rising conductivity reading shows increasing impurities or a generally increasing concentration in the case of a chemical stream (with some exceptions in concentrated solutions). See table 1 for a comparison of resistance and conductivity.

TABLE 1

SPECIFIC CONDUCTANCE MICROMHO/CM*	SPECIFIC RESISTANCE MEGOHM-CM*	PARTS PER MILLION			GR. / GAL. AS CaCO3
		AS ION	AS CaCO3	AS NaCl**	
.055	18.240	NONE	NONE	NONE	NONE
.056	18.000	.036	.028	.022	.002
.063	16.000	.041	.031	.025	.002
.071	14.000	.046	.036	.029	.002
.083	12.000	.054	.042	.033	.002
.100	10.000	.065	.050	.040	.003
.500	2.000	.325	.250	.200	.015
1.000	1.000	.650	.500	.400	.029
10.000	.100	6.500	5.000	4.000	.292
80.000	.0125	52.000	40.000	32.000	2.340
625.000	.0016	406.250	312.500	250.000	18.273
10,000.000	.0001	6,500.000	5,000.000	4,000.000	292.398

\* At 25°C \*\* At 25°C given specific conductance values included in this table.

TABLE 2

CONDUCTIVITY (MICROMHOS-CM)	RESISTIVITY (OHMS-CM)	DISSOLVED SOLIDS (PPM)
.056	18,000,000	.0277
.084	12,000,000	.0417
.167	6,000,000	.0833
1.00	1,000,000	.500
2.50	400,000	1.25
20.0	50,000	10.0
200	5,000	100
2000	500	1,000
20,000	50	10,000

Note: ppm x 2 = conductivity

CONDUCTIVITY OF VARIOUS AQUEOUS SOLUTIONS AT 25°C

SOLUTION	CONDUCTIVITY	RESISTIVITY
Pure water	0.05 uS/cm	18 MΩ-cm
Power plant boiler water	0.05-1 uS/cm	1-18 MΩ-cm
Distilled water	0.5 uS/cm	2 MΩ-cm
Deionized water	0.1-10 uS/cm	0.1-10 MΩ-cm
Demineralized water	1-80 uS/cm	0.01-1 MΩ-cm
Mountain water	10 uS/cm	0.1 MΩ-cm
Drinking water	0.5-1 mS/cm	1-2 kΩ-cm
Wastewater	0.9-9 mS/cm	0.1-1 kΩ-cm
KCl solution (0.01 M)	1.4 mS/cm	0.7 kΩ-cm
Potable water maximum	1.5 mS/cm	0.7 kΩ-cm
Brackish water	1-80 mS/cm	0.01-1 kΩ-cm
Industrial process water	7-140 mS/cm	rarely stated
Ocean water	53 mS/cm	rarely stated
10% NaOH	355 mS/cm	rarely stated
10% H2SO4	432 MS/cm	rarely stated
31% HNO3	865 mS/cm	rarely stated

The periodic table displays elements from Hydrogen (H) to Oganesson (Og). It is organized into groups (IA-VIIIA) and periods (1-7). A legend defines categories: Alkali Metals (yellow), Alkaline Earth Metals (orange), Transition Metals (green), Metals (purple), Metalloids (blue), Nonmetals (light blue), Halogenes (pink), and Noble Gases (light green). Lanthanoids (Ce-Lu) and Actinoids (Th-Lr) are shown in separate tables below the main table.

X-50 LOD (ppm)	APPLICATION
1 5-10 2 2 2	ROHS POLYMER OR PLASTIC (NON PVC)
	Cd
	Cr
	Pb
	Hg
1 15 7 7 6	PVC (40% OR MORE CL)
	Cd
	Cr
	Pb
	Hg
< 20	ROHS PACKAGING DIRECTIVE
	Sum Cd + Cr + Pb + Hg
3-5 1-2 1-2 3-5	PRECIOUS METALS EXPLORATION AND MINING
	Gold (Au) in soil, sediment
	Silver (Ag) in soil, sediment
	Platinum Metals Group I: Pd, Rh, Ru
	Platinum Metals Group 2: Pt, Ir, Os
15-25	SOME RARE EARTH ELEMENTS (NON ALLOYS ONLY)
	La, Ce, Pr, Nd

X-50 LOD (ppm)	APPLICATION
5-10 1-2 1 4-5 4-5 20 3-5 3-5 3-5 3-5 5-8 5-8 5-8	EPA RCRA AND PRIORITY POLLUTANT METALS, (SOIL RANGING FROM SiO2 TO 3-5% FE-CONTENT), MANY LIQUIDS, OIL OR FUELS, ALUMINUM ALLOYS
	Cr
	Cd
	Ag
	Sn
	Sb
	Ba
	Pb
	As
	Hg
<80	SN-BASED SOLDERS (ROHS)
	Cd



## ENVIRO MEASURE INC.

MEASUREMENT & TECHNOLOGY SOLUTIONS

### TERMS & CONDITIONS

**PRICE & PAYMENT TERMS:** Every effort will be made to give reasonable notice of price changes, however EMI reserves the right to change prices without notice. Price lists and quotes are net of taxes. Quotations are valid for thirty (30) days after which they may be subject to change. Standard terms are Net 30, subject to credit approval. Accounts over 30 days are subject to a 2% interest charge on all past due amounts. Accounts with amounts over 60 days will be subject to credit hold. Returned cheques (NSF) are subject to a surcharge of \$25.00 per cheque.

**SHIPMENTS:** All shipments are FOB warehouse. Shipping costs and insurance (if necessary) are prepaid and add unless otherwise specified. Shipments of Hazardous Goods items require special handling and paperwork and will be subject to a \$30.00 to \$60.00 service charge. Pick up and collect orders will be charged \$5.00 for required DG paperwork.

**CUSTOMER SUPPORT:** EMI's primary objective is to respond quickly and efficiently to your technical needs or help you select the right items. Please do not hesitate to contact our Technical Support Staff for after sales support at 1 800 560-4402.

**STORAGE:** Directions for the use and storage of reagents are provided on the box or in the instruction manuals. Proper use and storage of reagents are an integral part of our warranty terms and conditions.

**SAFETY:** Proper care of packaging and shipping of all products is of utmost importance. Please use proper protection when unpacking and testing of parameters while using any harmful chemicals. Material Safety Data Sheets (MSDS) are provided; please read them in respect to handling of harmful chemicals and take proper care in disposal with regard to human health and the physical environment. Call if you have any further questions.

**SERVICE:** A return authorization (RA) is required prior to shipping product for repair or service. Units sent in for repair or service are subject to a minimum service charge (non-refundable), unless a service package has been purchased.

#### RENTAL AGREEMENT

- 1. RENTAL PAYMENTS:** The Lessee agrees to pay to EMI, without set off or deduction, the rental payments in the amounts, and at the times described on the rental order, as well as any extended rental charges applied upon receipt of the rental unit.
- 2. ACCEPTANCE:** The Lessee shall inspect the equipment and notify EMI of any damage or defects within 24 hours of the commencement date in paragraph 2, otherwise the Lessee shall be conclusively deemed to have accepted the equipment and acknowledged that the equipment is in good condition and repair and suitable for the Lessee's purposes.
- 3. COVENANTS OF LESSEE:** The Lessee agrees with EMI as follows:
  - a) To use and preserve the equipment at their own risk and in a careful, lawful and proper manner, in the manner it was intended, and following operating and maintenance instructions and not to make any alterations, modifications or repairs to the equipment without the prior written consent of EMI;
  - b) To return the equipment at the expiry of the term in the same condition in which it was rented, including manuals and accessories, to the Lessor, or be held responsible for any costs incurred in cleaning and/or repair of the equipment;
  - c) That EMI shall not be liable for any loss, costs, damages or expenses (including bodily injury or death, damage to property or economic loss) arising in any way from the Lessee's possession or use of the equipment;
  - d) That the equipment is and shall remain at all times the personal and moveable property of EMI;
  - e) Not to create or permit any liens, charges or encumbrances whatsoever against its interest in either this rental agreement or the equipment;
  - f) Not to assign this agreement or sublease or part with possession of the equipment, without the prior written consent of EMI;
  - g) To maintain, at its own expense, insurance on the equipment against loss or damage through fire, theft, public liability and such other perils and risks as against which a prudent owner or user would insure and in such amounts as may be reasonably required by EMI, with loss payable to EMI;
  - h) Accessories purchased for use with the equipment are the sole responsibility of the purchaser; and are not returnable;
  - i) Any components damaged, or spare parts that are used up while the unit in the Lessee's possession will constitute an extra charge.
- 4. DEFAULT:** The Lessee shall be in default under this agreement upon the happening of any of the following events:
  - a) The Lessee fails to make any payment or perform or observe any covenant provided herein;
  - b) The Lessee makes an assignment in bankruptcy or takes the benefit of any statute now or hereafter in force for bankrupt or insolvent debtors;
  - c) The equipment is seized or attached by legal process or if distress is levied thereon;
  - d) The equipment is, in the reasonable opinion of EMI, in danger of loss, damage or destruction.
- 5. REMEDIES ON DEFAULT:** Upon default by the Lessee, hereunder EMI may, in addition to any other remedies permitted by law, exercise any or all of the following remedies:
  - a) Take possession of the equipment and enter any premises for the purpose of same;
  - b) Declare the entire amount of the then unpaid rental payments to be immediately due and payable; and
  - c) Do all acts and make all expenditures necessary to remedy any breach by the Lessee hereunder and require the Lessee immediately to reimburse EMI for the same.
- 6. NON-WAIVER:** Any forbearance or indulgence by EMI in any regard whatsoever does not constitute a waiver of the term or condition to be performed by the Lessee to which the same may apply.
- 7. CONTAMINATED:** EMI accepts no responsibility or liability for contamination of any customer's wells. The Lessee is responsible for decontamination of the equipment and is held responsible for all expenses related to the inspection and decontamination of the equipment.
- 8. APPLICABLE LAW:** The agreement shall be governed by and construed in accordance with the laws of the Province in which it was rented from and in.
- 9. CONSUMABLE PRODUCTS:** All reagents and consumable products purchased to use with the equipment cannot be returned due to contamination concerns and the integrity of the product. Some brands of unopened product may be returned with a 20% restocking fee, but only with the prior authorization of an EMI representative. Disposal of used product and chemicals is the sole responsibility of the Lessee.
- 10. CLEANING AND DAMAGES FEE:** If it is determined that the equipment was not used, cleaned or stored in the proper manner, it should be understood that all repairs, cleaning and parts replacement (including manuals) to service the equipment will be charged to the client. Please understand that there is to warranty or insurance attached to any of the rental equipment.

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**EMI**

**ENVIRO MEASURE INC.**

MEASUREMENT & TECHNOLOGY SOLUTIONS

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OSPREY GROUP  
  
OSPREY SCIENTIFIC INC.  
MONITORING & SAMPLING SOLUTIONS