

APPENDIX E
Lists of Equipment and Specification of
Measuring Equipment

Table 7-1 Equipment list for site survey

Item	Equipment Description	Quantity
1	LEICA TC600, total station theodolite	1 set
2	RADIODETECTION RD432PDL-2 high precision cables and pipes locator	1 set

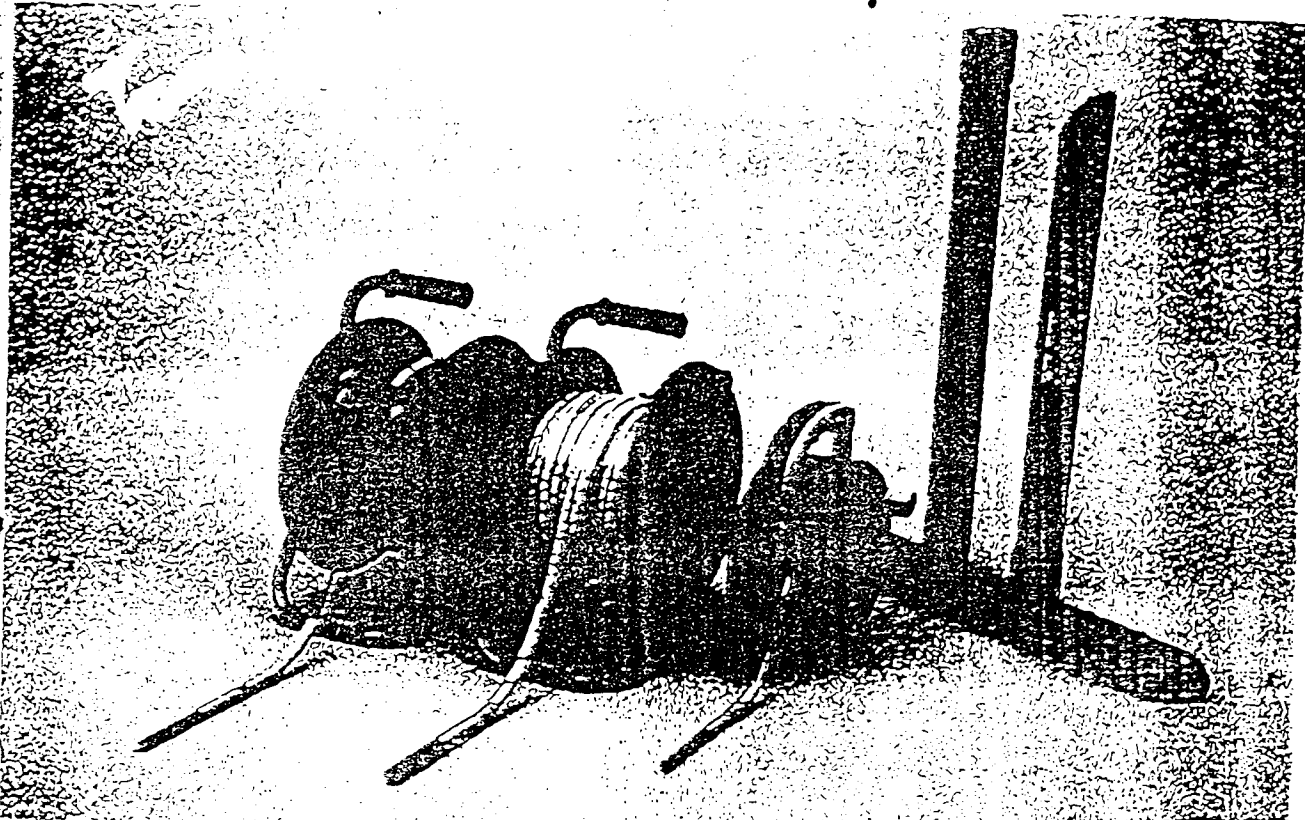
Table 7-2 Equipment list for well construction

Item	Equipment Description	Quantity
1	75mm (3")Ø x 3500mm PVC horizontally slotted pipe (schedule 40)	4 nos.
2	50mm (2")Ø x 6750mm PVC horizontally slotted pipe (schedule 40)	2 nos.
3	75mm (3")Ø x 3800mm PVC horizontally slotted pipe (schedule 40)	8 nos.
4	75mm (3")Ø x 5800mm PVC horizontally slotted pipe (schedule 40)	8 nos.
5	GVP Dedicated Tip	36 nos.
6	GVP Tip Screen	36 nos.

Table 7-3 Equipment list for pilot test

Item	Equipment Description	Quantity
1	GAST R6340R-50 explosion proved, soil vapour regenerative blower (max. vacuum of 65 " water and flow of 180 cfm)	1 set
2	GAST Regenair® Moisture Separator with relief valve and drain valve	1 set
3	GAST AJ151D in-line filter	1 set
4	GAST AE134 Vacuum gauge (0-160 " water, ½ " NPT connection)	2 nos.
5	GAST AE133 Pressure gauge (0-160 " water, ½ " NPT connection)	1 no.
6	Temperature gauge (range : 0 - 100°C)	2 sets
7	Campbell CI053080H5 5Hp Air Compressor	1 set
8	DWYER 2001, Magnehelic differential pressure gauge (range : 0-1 " water)	1 no.
9	DWYER 2005, Magnehelic differential pressure gauge (range : 0-5 " water)	1 no.
10	DWYER 2020, Magnehelic differential pressure gauge (range : 0-20 " water)	4 nos.
11	KANOMAX 24-6111 anemomaster (anemometer)	1 set
12	Sisgeo water level meter	1 set
13	Ultrasonic airborne level meter	4 nos.
14	MultiRAE PGM-50-5PD Gas Monitor	1 no.
15	LFG-20 Landfill Gas Monitor	1 no.
16	YSI 52 Dissolved Oxygen Meter	1 no.
17	Mark 9821 Helium Detector	1 no.

SISGEO



SISGEO water level meters are used to measure the depth of water table in Casagrande or standpipe piezometers, boreholes or wells relative to an arbitrary datum, generally the top of the installed tubes or ground level. The instrument consists of a stretch resistant, insulated cable coiled on a reel. The cable is suitably marked at graduated increments along its length. The cable end is fitted with a dipping probe which acts as a switch and activates an audible alarm when in contact with water. A light indicator is available as an option. The probe's alarm position represents the water level depth and is read directly from the graduated cable. The instrument is easy to use, reliable, robust and corrosion resistant. It is battery powered and portable.

⑦

Water level measurement in Casagrande and standpipe piezometers, boreholes and observation wells

Determination of water table levels

Hydrological and hydrogeological investigations

Permeability testing during drainage and de-watering activities

Dipping probe can be used in small diameter boreholes

WATER LEVEL METERS

SISSEE**TECHNICAL SPECIFICATION**

The sensor unit type is the same for each model. Dipping probe dimensions vary to suit cable type. The different model number refers essentially to the design of cable.

MODEL	C111	C112	C113 and C113/T*
Dipping probe			
OD mm	10	12	10
Length mm	114	85	114
Material	Stainless steel and PVC	Stainless steel and PVC	Stainless steel and PVC
Weights			
Quantity	6 to 12	10	6 to 10
OD mm	10	12	10
Length mm	30	30	30
Material	Stainless steel	Zn Al alloy	Stainless steel
Cable			
Length in meters	30 to 500	50 or 100	30 to 150
Measuring scale divisions	meter	millimetre	centimetre
ECC accuracy standard	-	class II	class III
Diameter (or width) mm	4.0 (round x-section)	10 (flat profile ribbon tape)	4.0 (round x-section)
Sheath	PVC	nylon	PVC
Weight g/m	25	25	25

*C113/T Dipping probe is equipped with a thermoresistor to measure temperature at defined depths. Requires a SISGEO C5003T readout unit.

ACCESSORIES AND SPARES

C111KITR	Dipping probe and set of weights for C111 and C113.
PILA009V	Battery (Dry 9 Vcc) provides approximately 6 months life
WE302M00	Electric cable-graduated in meters-available in any length
WE304C00	Electric cable-graduated in centimetres-available in 30, 50, 60, 100 or 150m lengths
WE302MM1	Electric cable tape-100m graduated in mm
WE302MMS	Electric cable tape-50m graduated in mm
C1RUL150	Cable reel-PVC coated steel for 150m of cable or tape
C1RUL300	Cable reel-PVC coated steel for 300m of cable

We reserve the right to change our products and specifications without prior notice.

SISSEE

SISGEO S.r.l. Via Morandi, 27 - 2009



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KASONIC AIRBORNE LEVEL METER

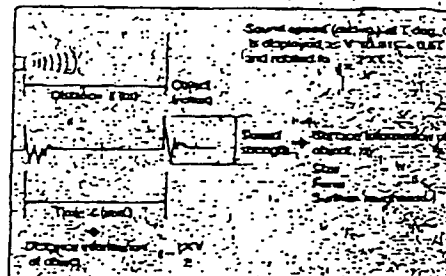
 HD700-A (50kHz)
 HD700-B (100kHz)

HD700 SPECIFICATIONS

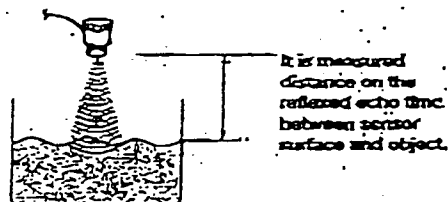
	HD700-A	HD700-B
Frequency	50kHz	100kHz
Outside dimension	Dia. 93 X 110(L) mm	
Power supply	DC 10 to 28 Volts, Wattage (Max): 3 watts (isolated power supply)	
Measurement range	Powder: 0.5 to 5.0 m Liquid: 0.5 to 9.99 m	Powder: 0.25 to 2.0 m Liquid: 0.25 to 4.0 m
Beam angle	14 deg.	
Back up memory	EPROM	
Operation temp.	(minus) -20 to 60 deg. C	
Environmental temp.	(minus) -30 to 80 deg. C	
Pulse number/output	1 to 30 times (optional select/sampling)	
Move/second	0.33 to 10 sec. (transferred timing)	
Display	3 figures, LED, unit cm Error message: "—" (3 bars)	
Setting	<Keyboard set up> -alarm signal output switch -amperage output for upper and lower	
Output	-alarm signal output switch NPN connector for a upper limit and a lower limit. -4 to 20 mA output signal for corrector	
Resolution	-inner: 1 mm (RS232C) -display: 1 cm step -set up: 1 cm step	
Operating temp. range for sensor	(minus) -20 to 80 deg. C display: 1 deg. C step, accuracy: ± 2 deg. C	
Measurement accuracy	$\pm 0.25\%$ of full scale or over than 1 cm	
Installation	G2 (PF2) — pipe size	
Controller housing material	PP	
Protection	IP65	
Weight	350 grams	
Wiring cable	-wiring cable length: approx. 10 m -water proof connector -KVC-22SBL01 -8 cables, 0.3 mm thick, black color	

AIRBORNE ULTRASONIC WAVE MEANS:

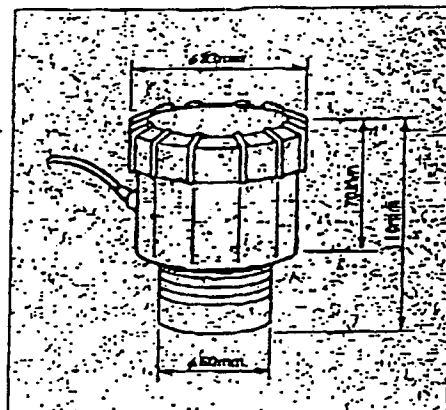
Ultrasonic airborne level meter applies principle of echo. Ultrasonic wave is transmitted and received in the air. It is one of measurement technology to be measured reflex echo transfer time between object and sensor.



AIRBORNE LEVEL METER



OUTSIDE DIMENSIONS



The specifications and appearance are subject to change without notice for improvement.



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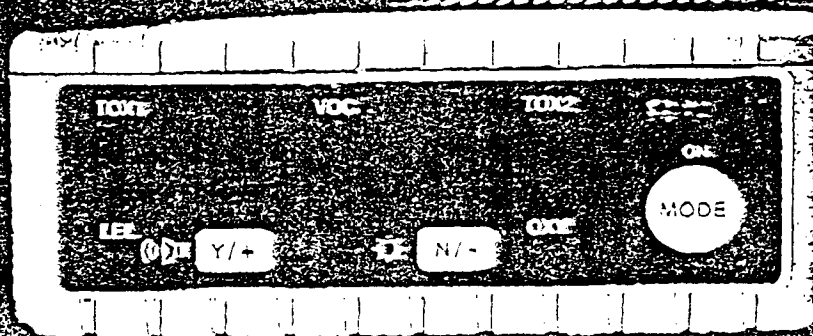
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MULTI RAE

PostNet Fax Note	7571	Date	20/8	Page	6
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Co Dept	Envirotech	Co	Science Int'l		
Phone #	25602450	Phone #	25437-40		
Fax #	25692415	Fax #	25414029		



one to five
gas monitor
with VOC
detection

Model PGM-50-5PD
P/N 009-3121-610

RAE SYSTEMS

MULTIRAE SPECIFICATIONS

GAS MONITOR	RANGE	RESOLUTION	RESPONSE TIME (T ₉₀)
Oxygen	0 - 30%	0.1%	15 sec
Combustible gas	0 - 100% LEL	1%	15 sec
VOCs	0 - 200 ppm	0.1 ppm	10 sec
	200 - 2000 ppm	1 ppm	10 sec
Carbon Monoxide	0 - 500 ppm	1 ppm	20 sec
Hydrogen Sulfide	0 - 100 ppm	1 ppm	30 sec
Sulfur Dioxide	0 - 20 ppm	0.1 ppm	18 sec
Nitric Oxide	0 - 250 ppm	1 ppm	20 sec
Nitrogen Dioxide	0 - 20 ppm	0.1 ppm	25 sec
Chlorine	0 - 10 ppm	0.1 ppm	60 sec
Hydrogen Cyanide	0 - 100 ppm	1 ppm	60 sec
Ammonia	0 - 50 ppm	1 ppm	150 sec
Phosphine	0 - 5 ppm	0.1 ppm	60 sec
Size:	4.65" L x 3.0" W x 1.9" H (11.8 cm x 7.6 cm x 4.8 cm)		
Weight:	16 oz with battery (454 g)		
Detector:	Protected catalytic bead for combustible gases Interchangeable electrochemical sensors for oxygen and toxic gases Photo ionization detector for VOCs, 10.6 eV lamp standard		
Battery:	Rechargeable, 4.8 V, 1.4Ah, Ni-Cd battery pack 4 AA alkaline battery adapter Field replaceable Battery charger: 10 hours through built-in or external charger		
Operating Hours:	10 hours continuous Unit will run and charge simultaneously 2 line, 16 digit LCD with LED back light automatically in dim light or alarm condition		
Key-Pads:	1 operation key and 2 programming keys		
Attachment:	Wrist strap and carry case with belt loop and shoulder strap		
Direct Readout:	Instantaneous (up to 6) values: Oxygen as percentage by volume Combustible gas as percentage of lower explosion limit (LEL) Toxic gases and VOCs as parts per million by volume High and low values for all gases STEL and TWA values of toxic gases and VOCs Battery and shut down voltage Date, time, elapsed time, temperature LEL/VOC scale (using correction factors)		
Intrinsic Safety:	UL, cUL Class I, Division I, Group A,B,C,D EEx ia IIC T4		
Alarm:	90 dB buzzer and flashing red LED to indicate exceeded preset limits High - 3 beeps and flashes per second Low - 2 beeps and flashes per second STEL and TWA - 1 beep and flash per second Alarms latching with manual override or automatic reset Additional diagnostic alarm and display message for low battery and pump stall		
Calibrating:	Two point field calibration for zero and span gas 20,000 points (64 hours, 8 channels at one minute intervals) down load to PC with serial number of unit, user ID, site number, calibration date		
Data logging Interval:	1 - 3600 seconds, programmable		
Sampling Pump:	Internal pump, flow rate 150 cc/min.		
Temperature:	-4° to 113° F (-20° to 45°C)		
Humidity:	0% to 95% relative humidity (non-condensing)		



MULTIRAE ACCESSORIES:

- Calibration kits with gas cylinder, flow regulator and tubing
- External battery charger
- Automotive charging adapter
- 15' (4.6 m) tubing with weight and float attachment
- Collapsible remote sampling probe
- Vibration alarm
- Earphone
- 11.7 eV PID lamp
- Additional sensors available— contact the factory for details

CONFINED SPACE KIT:

- PGM 80 MultiRAE Monitor
- Calibration adapter
- 58 liter multi gas cylinder
- Vinyl instrument case
- 15' Tygon® tubing or Teflon® lined Tygon® tubing, liquid float attachment
- Hand pump (for diffusion version)
- Battery charging adapter
- External battery charging station
- Alkaline battery adapter
- Manual
- Rugged carry case with pre-cut hard foam



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B U I L D Y O U R O W N P E R S O N

You expect more computing power from your VCR than your personal gas monitor and for the first time the MultiRAE brings the power of a personal computer to confined space monitors. This computing power gives you the flexibility to "build your own MultiRAE." Designed as a "building block" system, the MultiRAE can be configured from a simple, inexpensive Oxygen/LEL monitor all the way to an affordable five gas monitor for total protection in toxic environments. Like your PC, the MultiRAE is easily reconfigured and upgraded to meet your changing needs. MultiRAE's versatility allows it to replace a wide range of monitors, saving training and maintenance costs.

MultiRAE is quickly and easily changed from a sophisticated technician instrument to a simple text or display only monitor. The same monitor can be used as a personal monitor, a hand-held sniffer or area monitor for:

- Industrial hygiene work
- Emergency response
- Confined space entry

PREMIUM PERFORMANCE

The MultiRAE is certainly the "state of the art" of personal gas monitors, yet this power comes at an affordable price. MultiRAE has a lot of power that goes untapped by many other monitors. Like today's sophisticated software, the MultiRAE has the power if you need it, but it can easily handle even the simplest application.

TYPICAL VOCs

Fuel Products: Gasoline, Diesel, Jet Fuels, Benzene
Paints & Thinners: Xylene, Toluene
Grease and Oils: Trichloroethylene (TCE)
Degreasers: MEK, MPK, Perchloroethane
Resins & Plastics: Vinyl Chloride Monomer
Chemical Solvents: Acetone, Butyl acetate

FOUR GASES ARE LESS THAN TOTAL PROTECTION

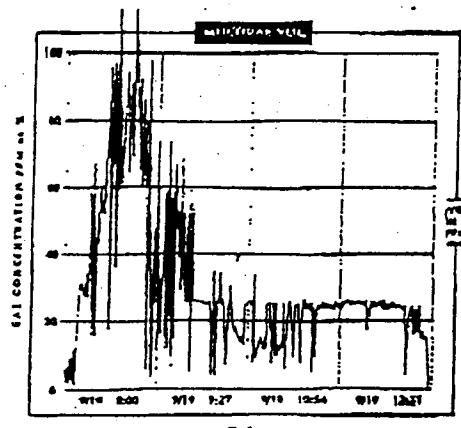
Most confined space monitors provide less than total protection because they miss many toxic vapors and gases. LEL sensors measure explosivity, not toxicity. Many Volatile Organic Compounds (VOCs) are potentially toxic at levels that are well below the sensitivity of the LEL sensors found in most multi-gas monitors. For example: by the time that LEL sensors even respond to gasoline vapors the air is already toxic! The MultiRAE accurately measures low levels of VOCs without the annoyance of false alarms that are so prevalent with other "broad-band" sensors. Its patented VOC monitor measures 0-2000 ppm of VOCs while providing continuous display and alarms for worker protection. Alarms can also be set for Short Term Exposure Levels (STEL), Time Weighted Average (TWA), Peaks and Minimums. The MultiRAE displays the exact airborne VOC levels so that you do not have to guess when to put on respiratory protection. With the MultiRAE you work safer, more efficiently and more comfortably because you can go longer without respiratory protection with complete confidence you are working in clean air.

Simple Windows™ software allows the user to cut and paste data and graphs into documents.

ChemSafe Company

To: Fred
 From: Jane

We need to keep concentration below 25 ppm. As you can see, we are not doing a good job. I recommend that we go with the proposal for a new ventilation system.



RUGGED AND AFFORDABLE—A HANDHELD COMPUTER—ACCURATE

MULTIRAE GAS MONITOR

MULTIRAE

Loud audible alarm with varying tones for different alarm conditions and an optional remote vibration alarm for noisy areas

VOC monitor:
0-2000 ppm

Large digital display

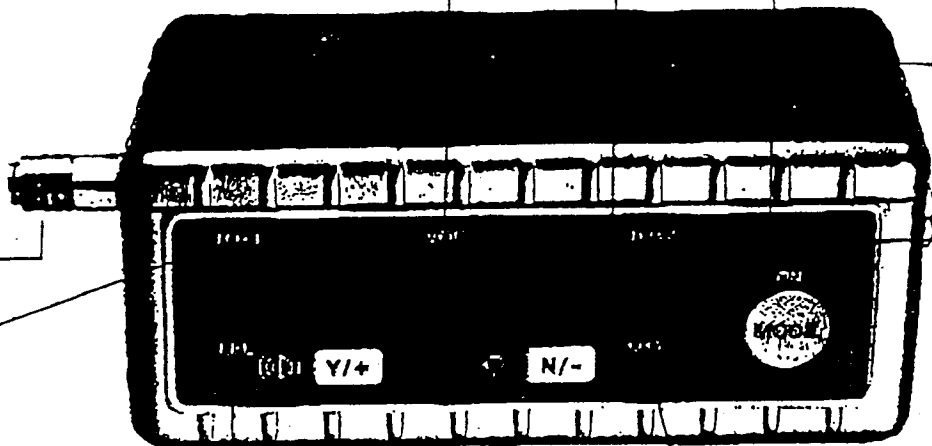
Visual alarm with flashing LED

Diffusion grill protected by Cortex™ moisture membrane

Draw over 100 (0 m) horizontally vertically!

Static liquid trap and pump

Two plug in "genius" sensors: CO, H₂S, SO₂, O₂, Cl₂, HCN, NH₃, PH₃



Datalogging up to 20,000 points

Photocell for automatic display. Backlight can be turned off to increase battery life

Combustibles: 0-100% of LEL Automatic LEL Over-Range Protection

Rugged weather proof composite case

Oxygen: 0-30%

Excellent RFI (Radio Frequency Interference) protection allows the Multirae to be used around portable radios without nuisance alarms

EASY TO USE

- Compact size and light weight for use in tight confined spaces
- Easy one button calibration with auto zero capability
- Calibrates with gas you already own
- Runs on alkalines, Ni-Cd batteries or continuously when plugged into charger or 12V automotive adapter
- Available as diffusion unit or with internal sample draw pump
- Internal pump provides quick response and remote sampling with 10-12 hours of run time
- Built-in pump eliminates need to charge and connect separate pump module
- Programmable alarms can be changed on the Multirae or from easy to use Windows™ 3.1 or Windows™ 95 software
- Internal memory holds response factors for 37 common LEL gases and 60 common VOCs (with ability to program custom factors)

Alarm Safety:

Separate alarm limit for:

Deficiency and enrichment of oxygen concentration
Low and high combustible gas concentration
TWA, STEL, low and high for toxic gases and VOCs

Gas	Symbol	Multirae Factory Preset Alarm Settings*				Calibration* Gas Concentration
		STEL	TWA	Low	High	
Oxygen	O ₂			19.5%	23.5%	20.9%
Combustible gas				10%	20%	50% LEL
VOCs		25	10	50	100	100 ppm isobutylene
Carbon Monoxide	CO	100	35	35	200	60 ppm
Hydrogen Sulfide	H ₂ S	15	10	10	20	25 ppm
Sulfur Dioxide	SO ₂	5	2	2	10	5 ppm
Nitric Oxide	NO	25	25	25	50	25 ppm
Nitrogen Dioxide	NO ₂	1	1	1	10	5 ppm
Chlorine	Cl ₂	1	0.5	0.5	5	10 ppm
Hydrogen Cyanide	HCN	4.7	4.7	4.7	50	10 ppm
Ammonia	NH ₃	35	25	25	50	50 ppm
Phosphine	PH ₃	1	0.3	1	2	5 ppm

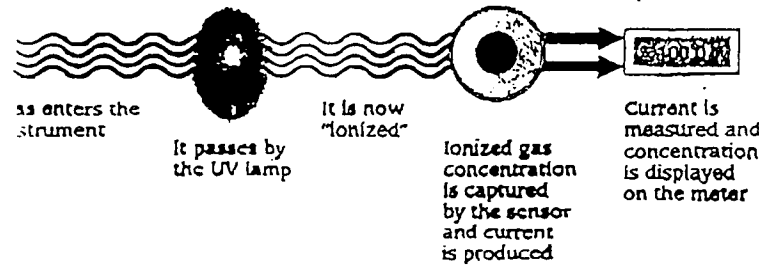
* All alarm limits and calibration span gas values are user programmable

* Cannot detect Ethane / Methane by PID method.

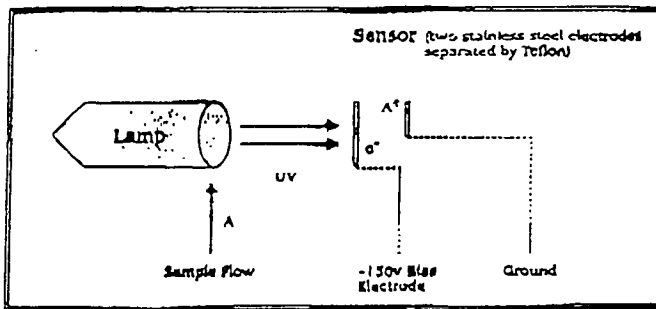
MEASURES 100+ GASES & VAPORS—EASY TO MAINTAIN

What is a photo ionization detector (PID)

The MultiRAE and ToxiRAE use an electrodeless 10.6 eV ultraviolet lamp to ionize chemicals with ionization potentials (I.P.) below 10.6 eV and thereby measure their concentrations in parts per million. The MultiRAE and ToxiRAE are best used to detect low levels (0 - 2000 ppm) of broad band toxics or volatile organic compounds (VOCs) -see over. Breakthroughs in lamp and sensor technology allow both MultiRAE and ToxiRAE to be small, rugged and affordable.



Note: Electrodeless lamps are available to detect volatile organic compounds with I.P. between 10.6 eV and 11.7 eV.



ADVANTAGES OF A PID SENSOR

Very sensitive - low ppm readings measured with confidence.

Instantaneous display, updated every second, for real time monitoring of toxic chemicals.

TWA and Peak values. Updated every minute, accessible to the user at the end of the work shift.

Threshold monitoring - visual and audio alarms in real time for STEL, TWA and Peak. Alarm signals vary for each condition.

Datalog for compliance and work shift trend analysis.

Historically, PIDs were calibrated to isobutylene because the response to this chemical is mid-point compared to a wide range of chemicals. A large table of calibration factors is available, alleviating the need to purchase many calibration gases.

Broad band toxic compound monitoring in the work place.

Up until now, the only way to get a "GO" or "NO GO" reading for broad band toxics or VOCs was the use of a broad band toxic sensor (MOS type) or a LEL sensor. These are not sensitive enough to provide accurate warnings of most toxic vapors until the permissible exposure levels are greatly exceeded. MOS and LEL sensors are best used in the percent range, not the ppm range. One percent is 10,000 ppm. Benzene's permissible exposure limit is 1 ppm, due to its highly carcinogenic nature. MOS and LEL sensors neither have the sensitivity nor the resolution to detect these levels. It is like measuring the thickness of a coin with a yard stick or meter ruler.

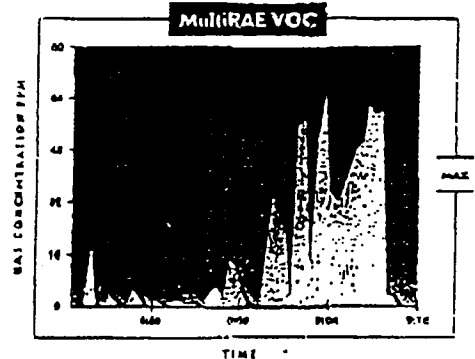
"Protection" versus "Detection"

PIDs have traditionally been considered as "detection" instruments, particularly used by first responders and the entry teams to determine the extent of a spill. MultiRAE and ToxiRAE are "protection" monitors, optimized for ambient air monitoring, alerting workers to potentially hazardous conditions.

MultiRAE and ToxiRAE can "See" when the permissible exposure levels are exceeded

While effective and proven, absorption tubes do not provide real time alarms. If permissible exposure levels are exceeded, personnel are unaware until days or weeks after the event. The MultiRAE and ToxiRAE provide instantaneous alarms to tell workers that they have exceeded exposure limits for a wide range of chemicals.

If levels are exceeded, the datalogging feature of the MultiRAE and ToxiRAE allows the manager to "see" what part of the day or night the levels were a problem, where a tube cannot tell if it happened all at once, or was accumulated throughout the course of the workers shift. The MultiRAE and ToxiRAE data can be instantly accessed from a personal computer. Subsequently, you do not have to wait days or weeks for laboratory results. You can immediately ask the worker what happened to create the situation that exceeded the exposure limits, while the worker can still recollect what happened. The answer could be as simple as cleaning with solvent or failure of a ventilator. Therefore, with instantaneous alarms and datalogging, safety action can be taken much quicker when using MultiRAE or ToxiRAE, than any other device.



Measuring a "witches brew" of chemicals for a particular toxic.

Many managers have frequently measured the relative percentage of a particular toxic using specific and quantitative techniques against PID readings, for example benzene in gasoline vapor. From this extensive data base, they have determined a surrogate method, implying that say half the Permissible Exposure Limit (PEL) is not exceeded if the broad band reading is below a certain value. For example, if the total petroleum hydrocarbon reading is below say 50 ppm, then benzene is below 0.5 ppm. The PID sensor is a broad band sensor. Ideal for this level of measurement.

VOLATILE ORGANIC COMPOUNDS DETECTED BY PIDS

10.6 eV lamp

Acetaldehyde
(Acetic acid)
Acetic anhydride
Acetone
Acrolein
Acrylamide
Acrylonitrile
Allyl alcohol
Allyl chloride
Allyl glycidyl ether
Allyl propyl disulfide
Anilino pyridine
Amyl acetate
Aniline
Anisidine
Benzene
Benzyl chloride
Bromoform
Butadiene
Butoxyethanol
Butyl acetate
Butyl alcohol
Butyl mercaptan
Butylamine
Butyl glycidyl ether
Butyl toluene
Camphor vapor
Carbon disulfide
Chloroacetaldehyde
Chloroacetophenone
Chlorobenzene
Chloromethyl methyl ether
Chloronitropropane
Chloroprene
Chrysene
Cresol
Crotonaldehyde
Cumene
Cyclohexane
Cyclohexanol
Cyclohexanone
Cyclohexene
Cyclopentadiene
Di-ethylhexyl phthalate
Diacetone alcohol
Diazomethane
Dibutylphthalate
Dichlorobenzene
Dichloro ethyl ether
Dichloroethylene
Dichlorvos
Diesel
Diethylamino ethanol
Diethylamine
Diglycidyl ether
Diisobutyl ketone

Diisopropylamine
Dimethylamine
Dimethylaniline
Dimethylformamide
Dimethylhydrazine
Dimethylacetamide
Dimethylphthalate
Dinitrotoluene
Dinitro cresol
Dinitro aniline
Dinitro benzene
Dioxane
Diphenyl
Dipropylene glycol methyl ether
(Epichlorohydrin)
(Ethanol)
Ethanolamine
Ethoxycetyl acetate
Ethyl acetate
Ethyl acrylate
Ethyl amyl ketone
Ethyl benzene
Ethyl bromide
Ethyl butyl ketone
Ethyl ether
Ethyl mercaptan
Ethyl silicate
Ethylamine
Ethylene dibromide
Ethylendiamine
Ethylencimine
Furfural
Furfuryl alcohol
Gasoline
Glycidol
Heptane
Hexane
Hexanone
Hexone
Hexylacetate
Hydroquinone
Isoamyl acetate
Isobutyl acetate
Isobutyl alcohol
Isophorone
Isopropyl acetate
Isopropyl alcohol
Isopropyl ether
Isopropylamine
Isopropyl glycidyl ether
JP 4,6,8
Ketene
Mesityl oxide
Methyl acetate
Methyl acetylene
Methyl acrylate
Methyl amyl ketone
Methyl bromide

Methyl cellosolve acetate
Methyl ethyl ketone
Methyl hydrazine
Methyl iodide
Methyl mercaptan
Methyl methacrylate
Methyl styrene
Methylamine
Methylcyclohexane
Methylcyclohexone
Methylcyclohexanol
Monomethylaniline
Morpholine
Naphthalene
Naphthylamine
Nitroaniline
Nitrobenzene
Nitrochlorobenzene
Nitromethane
Nitrosodimethylamine
Nitrotoluene
Octane
Pentaborane
Pentane
Pentanone
Perchloroethylene
Phenol
Phenyl ether
Phenylene diamine
Phenythydrazine
Phosphine
Phosphorus trichloride
Phthalic anhydride
Propyl acetate
Propyl alcohol
Propylene dichloride
Propylene imine
Propylene oxide
Pyridine
Quinone
Silbline
Stoddard solvent vapor
Styrene
Terphenyls
Tetrachloroethylene
Tetrachloronaphthalene
Tetrahydr uran
Tetramethyl lead
Toluene
Toluidine
Toner fluid vapor
Trichloroethylene
Triethylamine
Turpentine vapor
Vinyl chloride
Vinyl toluene
White spirit
Xylene

11.7 eV lamp

Acetic acid
Carbon tetrachloride
Chlorobromomethane
Chloroform
Dichloroethane
Epichlorohydrin
Ethyl chloride
Ethanol
Ethylene chlorohydrin
Ethylene dichloride
Ethylene oxide
Ethyl formate
Formaldehyde
Formic acid
Hexachloroethane
Liquid Petroleum Gas
Maleic anhydride
Methyl alcohol
Methyl chloride
Methyl chloroform
Methylene chloride
Methyl formate
Methyl isocyanate
Nitroethane
Nitromethane
Nitropropane
Phenyne
Propane
Propyl nitrate
Propargyl alcohol
Tetrachloroethane
Tetraethyl lead
Trichloroethane

Not Detected by PID

Acetonitrile
Carbon dioxide
Carbon monoxide
Ethane
Freons
Hydrogen
Hydrogen bromide
Hydrogen chloride
Hydrogen cyanide
Hydrogen fluoride
Methane
Nitric acid
Nitrogen
Oxygen
Ozone
Sulfur dioxide
Water

Specification

Carbon Dioxide and Methane

Measurement Technique	: Non dispersive Infrared absorption
Range	: 0-10.00%, 0-100.0%
Precision	: Over 0-10%, $\pm 0.5\%$: Over 10-50%, $\pm 3.0\%$: Over 50-100%, $\pm 5.0\%$
Response time to T_{90}	: Less than 15 seconds

Oxygen

Measurement Technique	: Electrochemical cell
Range	: 0-25.0%
Precision	: $\pm 0.4\%$ O ₂
Response time to T_{90}	: Less than 25 seconds

General

Displays	: Simultaneous digital display for all gases
Warm up time	: Less than 60 seconds
Analogue output	: 0-1V for each gas
Temperature range	: 5 to 40°C
Zero stability	: $\pm 0.05\%$
Dimension (H x W x D)	: 230 x 210 x 80mm
Weight	: 3kg (approx.)

YSI 52 D.O. Meter

Description

The YSI Model 52 is a microprocessor-based instrument designed for field and laboratory measurement of dissolved oxygen. Readings are automatically compensated for temperature. When calibrated to % air saturation, the display simultaneously shows dissolved oxygen in mg/L and in % air saturation as well as temperature in degrees Celsius. An RS232 port permits results to be sent directly to your serial printer or personal computer. Salinity compensation can be adjusted manually. To assure the highest accuracy, an autostable feature indicates when the readings have reached user-defined criteria for stability. To assure correct operation, the meter performs a self-testing routine each time it is turned on; any error is then signaled on the display.

Calibration is quick and easy. Procedures for calibrating with and without compensation for temperature, altitude, pressure, and salinity are described in this manual. Abbreviated instructions are printed on the back of the instrument, but operators should become familiar with the contents of this manual and the principles of dissolved oxygen measurement. The YSI Model 52 is also equipped with non-volatile memory, capable of storing up to 70 DO and temperature readings. Any data stored in internal memory can be reviewed on the LCD, or batch uploaded to a PC or an RS232 printer. Power is provided by an AC adapter (optional), or by batteries which permit field use.

I.A. Principles of Operation

YSI dissolved oxygen probes use membrane covered, Clark-type polarographic sensors with built-in thermistors for temperature measurement and compensation. A thin permeable membrane, stretched over the sensor, isolates the sensor elements from the environment, but allows oxygen and certain other gases to enter. When a polarizing voltage is applied across the sensor, oxygen that has passed through the membrane reacts at the cathode, causing a current to flow

II. Specifications

Oxygen Measurement

Ranges: 0.0 to 19.99 mg/L dissolved oxygen
0.0 to 199.9% air saturation

Accuracy: $\pm 0.1\%$ of saturation value, plus 1 Least Significant Digit for mg/L readings, plus probe error
 $\pm 0.1\%$ of air saturation, plus 1 Least Significant Digit for % readings, plus probe error

Resolution: 0.1% of the saturation value, expressed in mg/L, or 0.01 mg/L, whichever is greater;
0.1% air saturation

Temperature Measurement

Range: -5.0 to +45.0°C

Accuracy: $\pm 0.1^\circ\text{C}$, plus probe error

Resolution: 0.1°C

Temperature Compensation

The mg/L mode is automatically temperature-compensated to an accuracy of $\pm 1\%$ of DO readings between 0 and 5°C, and to an accuracy of $\pm 0.6\%$ of readings between 5 and 45°C.

The % air saturation mode is automatically temperature-compensated to an accuracy of $\pm 0.5\%$ of calibration values between 0 and 5°C, and to an accuracy of $\pm 0.3\%$ of values between 5 and 45°C.

Salinity Compensation

Range: 0.0 to 40.0 ppt

Accuracy: ± 0.2 mg/L

Operating Environment

0 to 45°C, 10 to 90% humidity, non-condensing

Water Resistance

With the probe receptacle capped, every case opening is gasketed to resist the entry of water.

Power

The Model 52 is powered by an AC adaptor(optional) or 6 alkaline D cells. Batteries power the instrument for approximately 100 hours.

Size and Weight

21.6 by 28 by 9.5 cm; 2.4 kg

8.5 by 11 by 3.75 inches; 4.3 pounds



Features

- Quick display of sample results make leak locating fast and efficient
- Enhanced sensitivity for helium; not affected by background gases
- Portable, rugged instrument ideal for field use
- Digital LCD readout in % helium for quick leak pinpointing
- Rechargeable battery allows up to 8 hours of continuous use

Applications

- Underground Storage Tank Systems
- Process Piping Systems
- Sewer Lines
- Water Mains
- Bulk Terminal Lines

Ordering Information

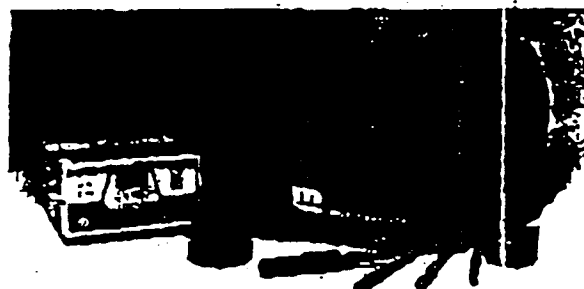
- Model 8821 Helium Detector comes complete with the following components:
 - Battery Charger
 - Complete Probe Assembly
 - Shoulder Strap
 - Padded Carrying Case
 - Instruction Manual

Specifications

Operating Range (% helium): 0.01-100%
 Display ranges: .00-.99%; 1.0-9.9%; 10-100%
 Operating Temperature Range: 14°F (-10°C) to 131°F (55°C)
 Power Source: 12 Volt rechargeable sealed lead-acid battery
 Operating Time (w/o recharge): Approximately 8 hours of continuous use
 Operating Cycle: 15 seconds to display results, purge time varies with amount of helium found
 Probe: 3-piece adjustable metal probe
 Filter System: In-line filter contained in handle
 Net Weight: 6.5 pounds (2.94 kg)
 Dimensions: 4 1/8" high x 8 1/8" deep x 7 1/4" wide; (10.6 cm x 22.5 cm x 19.0 cm)

Accessories

- Model 526 Portable Flowmeter



Warranty

Mark Products, Inc. warrants that its products shall be free from defects in workmanship and materials for one year (excluding battery). For details please see our warranty statement.

All specifications and descriptions are subject to change without notice.

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