Multigas Detector

[Bid Specifications]

Physical Characteristics	
Size	Instrument shall not exceed 4.4” L x 2.0” W x 1.37” D in total size.
Weight	Less than 7.9 oz.
Handling	Unit shall be a one-hand operation device.
Case material	Rubberized over-mold.
Environmental protection	Instrument shall be approval agency certified to IP67 protection levels for dust and water ingress.
Display	Display is viewable from the front with characters at least 0.3” tall.
Color	Charcoal - shall have an option for a phosphorescent (glow-in-the-dark) case.

User Interfaces	
Display type	Liquid crystal display [LCD] with large, easy to read characters and Icons.
Backlight	Unit must be provided with white backlight for low-light viewing. Backlight time-out to conserve power must be user adjustable.
Keypad/switches	Unit must have no more than three switches or pushbuttons to operate. There shall be no requirement to access hidden or internal switches for any instrument operations. Buttons must be easy to operate with gloves on.
Data access	Access to the data log and event log through infrared link to Windows-ready PCs.

Monitoring Capability	
Gases	Instrument shall be capable of measuring up to four gases: combustible gas, oxygen, CO, and H2S.
Sensor configuration	Ability to enable/disable individual sensor channels.
Sensor missing alarm	All sensor channels provide a missing sensor alarm if sensor has been removed and sensor channel has not been disabled.
Combustible gas display	Instrument shall be capable of displaying combustible gas reading as % Lower Explosive Limit [LEL] or 0-5% CH4 by volume.
Pressure compensation	Instrument oxygen sensor shall have built-in pressure compensation.
Sensor life monitoring	Instrument shall be able to alert the user when a particular sensor is nearing its end of life, following an instrument calibration.
Sensor types	Instrument shall be available with the following gas sensing options: Gas type — Range — Resolution combustible — 0-100% LEL — 1% LEL oxygen — 0-30% Vol — 0.1% Vol carbon monoxide — 0-1999 ppm — 1 ppm hydrogen sulfide — 0-200 ppm — 1 ppm

Basic Operational Features	
Instrument buttons	Buttons on instrument must be clearly marked and intuitive.
Inadvertent shutoff	Instrument shall be designed to protect against accidental shutoff.
Zero adjustments	Instrument shall provide Fresh Air Setup [FAS] function at user’s discretion.
Zero adjustment safety lockout	FAS function will not allow unit to zero out hazardous readings.
Confidence signals	Instrument shall provide periodic audible and visual signals indicating instrument operation. User shall have option of disabling audible and visual signals if desired. A green “Safe LED” will periodically flash when all conditions are safe.
Time/date	Instrument must be able to display time and date. User must be able to reset time and date without tools.
Last calibration date	Instrument must be able to display the last successful calibration date.
Instrument power-on	Power-on instrument button must be clearly marked.

Sensor Characteristics and Performance	
Sensor life	Sensors shall have an expected life of four-years.
End of life sensor indicator	Instrument shall notify user when sensor is close to and at its end of life, following a calibration.
Typical t(90) response times	Combustible sensor <10 seconds (Methane) < 25 seconds (Pentane) Oxygen sensor < 10 seconds CO sensor < 15 seconds H2S sensor < 15 seconds
All sensors	All sensors should have built-in control circuitry, including drive circuits, memory, microprocessor, and analog to digital converter to all for sensor level control and compensation.
Oxygen Sensor	Oxygen sensor shall be “lead-free” and use a non-consumable chemical reaction
Combustible Sensor	Combustible sensor must have at least the following poison resistance: 3000 ppm*hours to H2S 90 ppm*hours to silicon
CO / H2S Sensor	CO / H2S sensor will be designed with an extremely robust carbon filter for the CO channel to block interference. The sensor shall be designed so that this is virtually no cross-channel interference.

Advanced Display and Software Options	
Industrial hygiene displays	Instrument shall have the capability of displaying PEAK, STEL, and TWA at user’s discretion. User shall have ability to enable/disable STEL and TWA functions.
Instrument settings	All settable instrument parameters [alarm set points, expected cal gas values, etc.] shall be protected by a user-selectable password.
Reset of functions	User shall be provided with capability of resetting PEAK, STEL and TWA readings in the field.
Measurement units	Unit shall be capable of displaying both type of gas sensors installed, and measurement units for each gas.

Instrument Alarms	
MotionAlert™ feature	Instrument shall offer a MotionAlert feature. When activated, instrument shall go into latch alarm when no instrument movement is detected for 30 seconds.
InstantAlert™ feature	Instrument shall have an InstantAlert feature to allow users to manually activate all alarms if the situation requires.
Visual alarms	Visual alarms shall consist of bright, flashing LEDs on top and bottom of instrument and positive indication on unit’s display for alarm type identification.
Audible alarm	Audible alarm shall be rated at >95 dB @ 1ft.
Vibrating alarm	Unit shall be offered with standard vibrating alarm.
LEL latching alarm	Combustible channel shall have non-resettable latching alarm when combustible gas level exceeds 100% LEL or 5.00% CH4.
Oxygen alarms	Oxygen channel shall have alarm set points for both oxygen deficiency and oxygen enrichment.
Alarms set points	Alarm set points must be user-settable.
STEL and TWA alarm	Instrument shall provide audible, visual, and vibrating alarms if STEL or TWA levels are exceeded. User shall be able to select alarm set points for STEL and TWA.
Battery alarms	The monitor will provide user with 10-minutes warning of battery power loss in all environmental conditions. Power consumption alarms shall activate audible, visual, and vibrating alarms.

Instrument Power	
Run time	Instruments run time shall be 24 hours continuous running.
Power supply	Instrument shall be equipped with a rechargeable battery.
Battery life indication	Monitor shall provide icon depicting estimated remaining battery operation time. Battery icon must always be visible when instrument is powered on.
Charging cradle	Optional charging cradle shall be offered.
Charger Input voltages	Chargers shall be available for 110VAC/220VAC and 12-24VDC.
Charging status	Instrument or charging cradle shall provide visual indication of battery charging status.

Calibration	
Calibration tools	Unit shall require no special tools for calibration other than calibration cap, cylinder, regulator, and tubing to supply gas to instrument.
Pushbutton calibration	Calibration shall be easily performed using instrument's push buttons. Internal instrument access or tools shall not be necessary for calibration.
Calibration cylinder mix	Calibration gas shall be offered in a standard 4-gas configuration [combustible, O2, CO, and H2S] cylinder. Instrument shall be calibrated from one cylinder.
Calibration time	Span calibration shall not exceed 60 seconds.
Automatic calibration	Instrument shall be compatible with optional automated test and with calibration system able to store data. External system shall automatically recognize and calibrate instrument and retain all calibration records.
Bump test station	Economical bump test station shall be offered to verify field performance. Test station shall be capable of checking performance of standard 4-gas instrument [combustible, O2, CO, and H2S] and store records.

Sampling Systems	
Sampling modes	In addition to standard diffusion mode, monitor must be available with external powered pump probe option.
Sampling system filters	Pump must contain user-replaceable filters to prevent liquids and dust ingress.
Allowable sample line length	Instrument must be capable of sample draw from up to 50 feet away.
Fluid ingress protection	Sample probe designed to prevent water and debris from entering instrument shall be offered.

Data logging [Instrument Data Storage]	
Data logging	Instrument must be available with standard data logging.
Event log	Instrument shall record at least 500 events.
Data log capacity	Data log shall record and store data for an average of 50 hours [at one-minute intervals] without overwriting existing information in normal use.
Gas record content	Data log entries shall contain as a minimum date, time, and record of peak and average readings for each gas sensor [oxygen shall be recorded as maximum and minimum for the intervals].
Atmospheric record	Instrument shall have provisions to record atmospheric temperature changes.
Record intervals	Time span between data records shall be user-selectable from 15 seconds to 15 minutes.
Data retention	Instrument data stored in memory shall not be lost or corrupted in event of sudden instrument power loss.
Activity record Content page	Instrument data log shall record and be capable of reporting significant instrument events including: • Gas and battery alarms • Fresh air setups, sensor re-zeroing, and calibrations • Battery voltage and elapsed run time • Reset of PEAK, Min, STEL, and TWA values

Environmental and Durability	
Drop test	Can survive an incidental drop of 20'.
Temperature	Normal operation: 0 to 40° C Extended: -20 to 50° C Short periods [15 minutes]: -40 to +60° C
Humidity	15-90% RH [non condensing] continuous 5-95% RH [non condensing] Intermittent

Maintenance & Warranties	
Sensor replacement	Sensors shall be easily accessed and replaced by users if desired by the purchaser. No printed circuit boards should need to be removed to access sensors.
Warranty, consumables	Instrument shall have a three-year warranty on all components, including sensor and battery.
Extended Warranty	Optional extended warranty shall be offered for an additional 1 year (4 year total).

Certifications	
USA and Canada	USA / Canada ETL Class I, Division 1, Groups A, B, C & D Class II, Division 1, Groups E, F & G Class III, Division 1 Ambient temperature: -40°C to +54°C; T4 Canada CSA - Pending Class I, Division 1, Groups A, B, C & D CAN/CSA C22.2 No. 152 Combustible Gas Detection Instruments C22.2 No. 152 Performance Ambient Temperature: -20°C to +54°C; T4 C22.2 No. 157 Intrinsic Safety Ambient Temperature: -40°C to +54°C; T4
Europe	Directive 94/9/EC (ATEX): II 1G Ex ia IIC T4 Ga, -40°C to +60°C, IP67 (Zone 0 with no combustible sensor installed) II 2G Ex ia d IIC T4 Gb, -40°C to +60°C, IP67 (Zone 1 with combustible sensor installed) CE 0080 Directive 2004/108/EEC (EMC): EN50270 Type 2, EN61000-6-3
Australia / New Zealand	Australia/New Zealand Test Safe Australia Ex ia s IIC T4, -40°C to +60°C, IP67 (Zone 0) IECEx TestSafe Australia Ex ia IIC T4 Ga, -40°C to +60°C, (Zone 0 with no combustible sensor installed) Ex ia d IIC T4 Gb, -40°C to +60°C, (Zone 1 with combustible sensor installed)
Manufacturing system quality approvals	Instrument manufacturer must be certified compliant with ISO 9001 provisions.