

## Bid Specifications

### MeshGuard – Battery-Operated Wireless Gas Detector

#### Overview

MeshGuard is a rugged, battery-powered toxic or combustible gas detector integrated with a wireless mesh radio modem. Key features include up to 6 months operation on disposable battery, extreme fast installation, self-configuration of the network, and worldwide approved wireless frequency coverage. Designed for use in harsh environments and easy to service in the field, MeshGuard is a truly unique wireless solution for remote chemical detection in hazardous areas.

#### Sensor Requirements

Instrument shall support field-replaceable sensors for the same type of gas.

Combustible Gas Sensors	Range	Resolution	Response Time
Catalytic LEL	0 to 100% LEL	1% LEL	T90<30 Sec/T10<10 Sec
Non-Dispersive Infra-Red (NDIR) LEL	0 to 100% LEL	1% LEL	T90<30 Sec/T10<10 Sec

Sensors for Oxygen& Toxic Gases	Range	Resolution	Response Time
Carbon Monoxide (CO)	0 to 2000 ppm	1 ppm	T90<30 Sec/T10<30 Sec
Hydrogen Sulfide (H <sub>2</sub> S)	0 to 100 ppm	0.1 ppm	T90<30 Sec/T10<30 Sec
Oxygen	0 to 25% Vol	0.1 %	T90<15 Sec/T10<15 Sec
Chlorine (CL <sub>2</sub> )	0 to 50 ppm	0.1 ppm	T90<30 Sec/T10<30 Sec
Ammonia (NH <sub>3</sub> )	0 to 100 ppm	1 ppm	T90<30 Sec/T10<30 Sec
Sulfur Dioxide (SO <sub>2</sub> )	0 to 20 ppm	0.1 ppm	T90<30 Sec/T10<30 Sec
	0 to 100 ppm	1 ppm	T90<30 Sec/T10<30 Sec

Gamma Sensor	
Dose Rate Range	1 µR/h to 20 mR/h (0.01 µSv/h to 200 µSv/h, or 0.01 µGy/h to 200 µGy/h)
Energy Range	0.06 to 3.0 MeV (X-ray and Gamma radiation)
Accuracy	±20% from 100 µR/h to 20 mR/h (1 µSv/h to 200 µSv/h, or 1 µGy/h to 200 µGy/h) ±30% or 5µR/h from 1 µR/h to 100 µR/h (0.01 µSv/h to 1 µSv/h, or 0.01 µGy/h to 1 µGy/h), whichever is greater
Response Time	T90 < 5 sec (Dose Rate > 1 mR/h, 10 µSv/h or 10 µGy/h)

Sensor Warranty	Year(s)
Carbon Monoxide (CO)	2
Hydrogen Sulfide (H <sub>2</sub> S)	2
Oxygen	2
Chlorine (CL <sub>2</sub> )	1
Ammonia (NH <sub>3</sub> )	1
Sulfur Dioxide (SO <sub>2</sub> )	1
Gamma	1

Unit Warranty	Year(s)
All Units (Excluding internal battery)	2

## Unit Power

**Battery:** Interchangeable D-size Lithium Battery, +3.6V, 19 Ah  
External rechargeable pack

**Operating Period:**

Electrochemical sensors:

- Up to 6 months continuous operation using internal battery
- Up to 1 year continuous operation external battery pack

Catalytic LEL sensors:

- Up to 5 days continuous operation using internal battery
- Up to 22 days continuous operation with external battery pack

Non-dispersive Infrared sensors:

- Up to 2 months continuous operation using internal battery
- Up to 1 year continuous operation with external battery pack

Gamma sensor:

- Up to 2 months continuous operation using internal battery

## User Interface

**Display:** Customized LCD (1" x 1.5" / 72mm x 108mm) with backlight provides direct readout of:

- Gas type measured and concentration in parts per million or LEL %
- Battery status
- Alarms (Low and High, STEL & TWA optional)
- Wireless connectivity and status symbol

**Programming:** Fully programmable without PC. Programming menu password protected.

**Keypad:** Three-button click operation, non-membrane type buttons.

## Alarms

**Alarms:**

- 92 dB (at 30 cm) buzzer and flashing red LED to indicate exceeded preset limits.
- High: Displays "High" emits 3 beeps and flashes per second.
- Low: Displays "Low" 2 beeps and flashes per second.
- STEL: Displays "STEL" 1 beep, vibration and flash per second.
- TWA: Displays "TWA" 1 beep, vibration and flash per second.
- Alarms latching with manual override or automatic reset.
- Additional diagnostic alarm and display message for low battery.

## Wireless Communication

**Radio model:** RM2400A  
**Radio Frequency:** 2.4 GHz IEEE 802.15.4  
**Frequency Range:** 2.400-2.4835 GHz  
**Frequency Channels:** Frequency band has 16 available channels  
**Transmission Range:** Up to 300 meters line of sight  
**Receiver Sensitivity:** Minimum of -95 dBm at 2.4 GHz  
**Modulation:** 802.15.4 DSSS BPSK  
**Transmit Power:** 20 dBm  
**Data rate:** 250 kbps

**Radio:** The Radio should be configurable from Reduced Function Device (RFD) to Full Function Device (FFD) without use of PC

## **Maintenance**

<b>Field Maintenance:</b>	Replaceable filter, sensor and battery
<b>Calibration:</b>	Two-point calibration for zero and span
<b>Adjustment:</b>	No potentiometer are allowed only firmware adjustment
<b>Battery replacement:</b>	Must offer battery option which can be replaced in classified area

## **Physical Specifications**

<b>Size:</b>	26.5 cm x 9.5 cm x 5.5 cm / 10.5" L x 3.7" W x 2.1" H
<b>Weight:</b>	0.6 kg /1.3 lbs
<b>Display:</b>	4 lines, with LED automatic backlight
<b>Sensor mounting:</b>	Plug-in, quick sensor swapping for easy maintenance with splash guard option
<b>Housing:</b>	Strong, protective, concussion-proof design with super-rugged stainless steel mounting bracket.

## **Environmental Specifications**

<b>Temperature:</b>	-40° to 50° C (-40° to 122° F)
<b>Humidity:</b>	0 - 95% relative humidity (non-condensing)
<b>IP-rating:</b>	IP-65

## **Certifications**

### **Hazardous Area Approval:**

- US and Canada: C1, D1, Groups A, B, C, D, T4
- Europe: ATEX II 2G EEx ia IIC T4
- IECEX: Ex ia IIC T4

<b>EMI/RFI:</b>	Highly resistant to EMI / RFI. Compliant with EMC Directive 89/336/EEC. EMI/RFI additional +60 volts/meter
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### **Wireless Frequency and Approvals:**

ISM license free band. 2.4 Ghz. IEEE 802.15.4 standard complaint FCC Part 15, CE R&TTE, ANATEL

## **Quality**

<b>Quality:</b>	Instrument manufacturer must be certified to ISO 9001 or higher
<b>Sourcing Control:</b>	Critical components like sensors and radio modems must be manufactured in-house

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## Accessories

### **The MeshGuard Kit shall include the following accessories:**

- MeshGuard gas detector with built-in mesh radio modem
- 5 dBi whip antenna
- MeshGuard resource CD with:
  - Maintenance & Operation Manual
  - Quick Reference Guide
  - User presentation
  - Datasheet
- Quick Start/Deployment Guide
- Maintenance tool
- Calibration gas adapter

### **The MeshGuard System Kit shall include the following accessories:**

- 4 to 8 MeshGuard gas detectors with standard accessories
- 1 MeshGuard dedicated router as option
- 1 FMC 2000 controller with locked access and integrated mesh radio modem
- 2 Extension antenna (2 m)
- Spare batteries
- Military-grade transportation case