



## Hyattsville Volunteer Fire Department Training

Gas Meters



## Gas Meter's Carried on the Squad

1. Gas-Trac
2. CO Meter
3. 4 Multi-Gas Detector (MiniMax X4 Multi Gas Detector)



## **Gas Trac General Information**

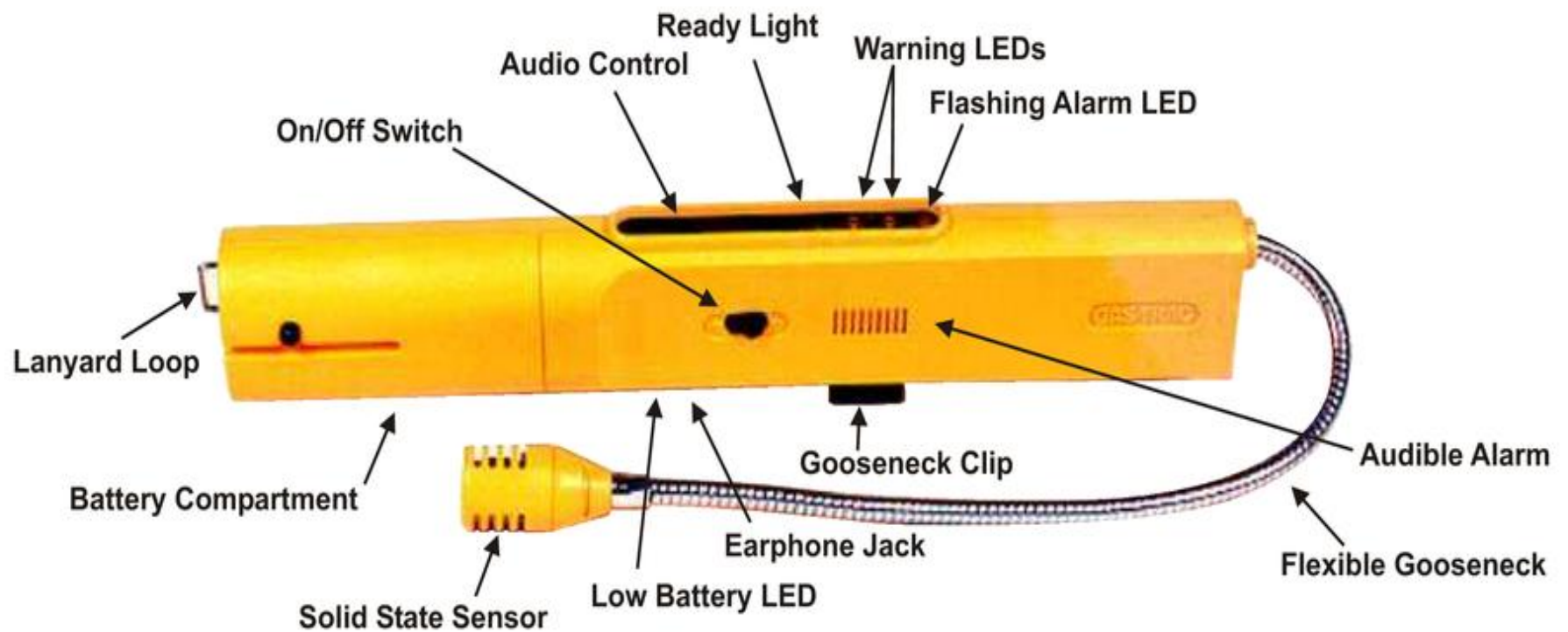
The Gas Trac is an instrument that is capable of detecting combustible gases. The Gas Trac is factory calibrated for methane in the air. The alarm will be set off when the methane concentration in the air approaches 40 percent of the lower explosive limit



## Most Common Detectable Gases

- Acetone
- Alcohol
- Ammonia
- Benzene
- Ethane
- Ethylene
- Gasoline
- Propane
- Refrigerants
- Smoke
- Steam
- Industrial Solvents
- Jet Fuel
- Lacquer Thinner
- Methane
- Naphtha
- Hydrogen Sulfide

# HYATTSVILLE volunteers



11/22/09

Gas Meters



## Directions to Use

1. Turn the Gas-Trac on in a non-contaminated atmosphere
2. The ready light should come on to determine that the meter is ready for use
3. The L.E.D. labeled "Slight" will light when .1% of the gas is detected. The "Medium" light will light when 1% of the gas is detected. The "Alarm" light will come on when 2% of the gas is detected.



## Directions to Use (Continued)

4. To pinpoint a leak source, adjust the “Tick Rate” control for the slowest uniform ticking sound. The tick rate will then vary, corresponding to the change in gas concentration detected. The tick rate is **independent** of the lights and alarm, which are calibrated to appropriate gas concentrations.



## CO Meter

The CO Meter should be turned on in an uncontaminated atmosphere.

Use common sense when using the meter, if people are complaining of head aches, SCBA must be worn.

Don't rely on home detectors, as they are not always accurate.



## CO Exposure Chart

(All Data Based on 1 Hour Exposures)

- **0-9 ppm (parts per million) CO:** no health risk; normal CO levels in air.
- **10-29 ppm CO:** problems over long-term exposure; chronic CO problems such as headaches, nausea- not the most dangerous level
- **30-35 ppm CO:** flu-like symptoms begin to develop, especially among the young and the elderly
- **36-99 ppm CO:** flu-like symptoms among all; nausea, headaches, fatigue or drowsiness, vomiting; **most CO detectors sound off here**
- **100 ppm + CO:** severe symptoms; confusion, intense headaches; ultimately brain damage, coma, and/or death, especially at 300 to 400 ppm+



## 4 Multi-Gas Detector

Is able to detect and display four gases

- Oxygen ( $O_2$ )
- Combustible Gas (LEL)
- Hydrogen Sulfide ( $H_2S$ )
- Carbon Monoxide (CO)

# HYATTSVILLE volunteers

## 4 Multi-Gas Detector

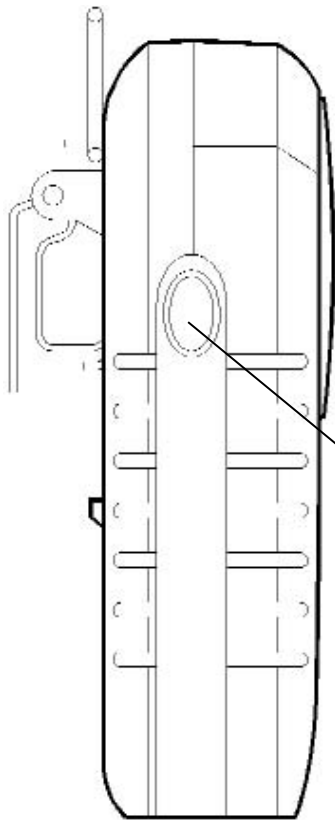


11/22/09

Gas Meters

# HYATTSVILLE volunteers

## Parts



Audible  
Alarm

On/Off  
Button

Button



Visual  
Alarm

Sensor  
Grille

LCD  
Display



## Directions to Use

1. In an uncontaminated atmosphere, hold the **on/off** button for two seconds
2. Clearing the previous STEL and TWA values- When the non-zero STEL and/or TWA values are carried over from the previous measurement, a “Delete no” prompt will be displayed with the gas labels and the STEL and TWA icons. Press the UP or DOWN buttons to scroll to “no” or “YES” and press the ON/OFF button to select.



## Directions to Use (Continued)

3. To turn off the detector, press and hold the ON/OFF button while in the measuring mode. A countdown will be displayed for 5 seconds, and then the detector will beep and turn off.



## List of Common Detectable Combustible Gases

- Hydrogen
- Methane
- Ethylene
- Methanol
- Ethane
- Ethanol
- Propane
- Butane
- Pentane
- Octane



## Combustible Gas

Meter will alarm at 10% of the LEL

PGFD requires SCBA on your back at 10% of the LEL  
and on air at 20% of the LEL



## Hydrogen Sulfide Exposure Levels

0.13 - This is the odor threshold. Odor is unpleasant. Sore eyes.

4.6 - Strong intense odor, but tolerable. Prolonged exposure may deaden the sense of smell.

10-20 - Causes painful eye, nose and throat irritation, headaches, fatigue, irritability, insomnia, gastrointestinal disturbance, loss of appetite, dizziness. Prolonged exposure may cause bronchitis and pneumonia.

30-100 - Sickeningly sweet smell noted.

50 - May cause muscle fatigue, inflammation and dryness of nose, throat and tubes leading to the lungs. Exposure for one hour or more at levels above 50 ppm can cause severe eye tissue damage. Long-term exposure can cause lung disease.

100-150 - Loss of smell, stinging of eyes and throat. Fatal after 8 to 48 hours of continuous exposure.



## Hydrogen Sulfide Exposure Levels (Continued)

200-250 - Nervous system depression (headache, dizziness and nausea are symptoms). Prolonged exposure may cause fluid accumulation in the lungs. Fatal in 4 to 8 hours of continuous exposure.

250-600 - Pulmonary edema (lungs fill with fluid, foaming in mouth, chemical damage to lungs).

300 - May cause muscle cramps, low blood pressure and unconsciousness after 20 minutes.

300 to 500 - ppm may be fatal in 1 to 4 hours of continuous exposure.

500 - Paralyzes the respiratory system and overcomes victim almost instantaneously. Death after exposure of 30 to 60 minutes.

700 - Paralysis of the nervous system.

1000 - Immediately fatal.



## Oxygen Levels

21%- Normal

19.5%- Can Normally Function

12 to 19.5%- Shortness of breath, headache, dizziness, quickened pulse, efforts fatigue quickly, muscular coordination for skilled movements lost

10 to 12%- Nausea and vomiting exertion impossible, paralysis of motion

6 to 10%- Collapse and unconsciousness occurs

0 to 6%- Death in 6 to 8 minutes



## 4 Multi-Gas Detector Alarm Points

Gas Detected	Range	Alarm Level 1	Alarm Level 2	STEL	TWA
Flammable	0 to 100% LEL	10% LEL	20% LEL	n/a	n/a
Oxygen	0 to 30 %	23.5 %	19.5 %	n/a	n/a
Carbon Monoxide	0 to 999 ppm	35 ppm	100 ppm	100 ppm	35 ppm
Hydrogen Sulfide	0 to 250 ppm	10 ppm	15 ppm	15 ppm	10 ppm

11/22/09

Gas Meters



## STEL and TWA

The STEL and TWA levels are not for our purposes of determining concentrations. They are there to determine total exposure, mainly for industrial use.

STEL- Short-term Exposure Limit

TWA- Time Weighed Average