

## PROCEDURES

### FLAME IONIZATION (FI) / LEAK SURVEY

#### 2.0 PURPOSE

The flame ionization unit (FI) is designed to detect the presence of hydrocarbons in concentrations ranging from 1 PPM to 100,000 PPM. The unit is used for scheduled, random, and miscellaneous gas leakage surveys. The FI unit is **not used** for gas leakage classification.

#### 2.1 FLAME IONIZATION UNITS

- A. Each of the following FI units is approved for use by the Operator and its contractors, for use in conducting leakage surveys.
  - 1. Southern Cross 400
  - 2. Heath Detecto-Pac II and III
  - 3. GMI FI2000
- B. FI units shall **Not** be used in closed environments where a potential explosive atmosphere may exist. The FI unit, because of its internal flame, is a potential source of ignition.
- C. The reference gas utilized by the FI units shall be certified 40% Hydrogen and 60% Nitrogen.
- D. Always turn on and zero FI in a nonflammable atmosphere (clean air).
- E. Always check for physical damage and/or missing parts before beginning.
- E. **Heath Detecto-Pac II and III:**
  - 1. Check batteries and change if necessary
  - 2. Check reference fuel and fill in necessary (never below 50 psig)
  - 3. Install the fuel cylinder in place and turn on (do not over-tighten)
  - 4. Check for clean inlet filter (change daily or more often if necessary)
  - 5. Attach probe
  - 6. Depress on/off test switch
  - 7. Press battery test switch
  - 8. Depress 10K ppm switch (allow 1 minute for fuel to purge)
  - 9. Press igniter switch, continuous flameout alarm should stop within 25 seconds, this indicates ignition
  - 10. If alarm does not go off repeat step until alarm stops
  - 11. Allow 5 minutes warm up time.
  - 12. Release 10K switch

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13. Zero instrument using zero control knob
  14. Check pulsating signal alarm by pulling up on the zero knob then slowly rotating the knob clockwise until pulsating alarm sounds (the pulsating alarm should turn on at meter reading between 35 – 45% of full scale. Return meter reading to zero.
  15. Verify unit is operational checking sensitivity with a small sample of known gas at the inlet (50ppm). Meter should swing upscale and return to zero
  16. Set unit to gas range to begin survey
- Note:** at higher altitude, above 3000 ft, a slightly richer reference fuel mixture may be necessary (42% hydrogen / 58% nitrogen)

#### F. Southern Cross 400:

1. Check Batteries and replace if necessary
2. Check reference gas and fill if necessary (minimum 800 psig)
3. Install the fuel cylinder in place (do not over-tighten)
4. Check for clean inlet filter (Change daily or more frequently if necessary)
5. Attach probe
6. Open reference fuel valve (listen for hissing of moving gas)
7. With zero adjust knob fully counterclockwise, turn power switch on
8. LED and alarm should come on and stay on
9. Press the ignitor switch, alarm and LED should go off within 3 seconds
10. If not wait 5 seconds and try again
11. If LED and alarm stay on, FI unit is in need of further repair
12. When both go out, slowly rotate the zero adjust knob clockwise to 100 and then counterclockwise to zero
13. Adjust alarm point (should be between 40 and 50%)
14. Anytime you note that the alarm point has dropped for 4-8%, the batteries need to be replaced
15. Extinguish the flame by placing your thumb over the intake. LED and alarm should come on within 3 seconds. Reignite the unit.
16. Check for leaks in the sample system by removing the probe. LED and alarm should come on within 3 seconds. Reinstall the probe.
17. Turn zero knob fully counterclockwise, wait 5 seconds and reignite the unit
18. If any of these tests fail further repair is required
19. Perform calibration bump test with known gas sample (50ppm gas)
20. Set unit to gas range to begin survey

#### G. GMI FI200:

1. Check Batteries and replace if necessary
2. Check reference gas and fill if necessary
3. Install the fuel cylinder in place (do not over-tighten)

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4. Check for clean inlet filter
5. Check that exhaust gauze assembly is clean and securely fitted
6. Open reference gas cylinder and wait 10 seconds before turning unit on
7. The instrument will begin its start up sequence (approx 30 seconds)
8. LED Illuminates, alarm sounds FLAME flag flashes and reading falls for near 10 to zero
9. When start up is successfully completed LED is extinguished, flame out alarm is silenced, FLAME flag disappears and current gas reading is displayed
10. If start up fails, follow steps again. If still unsuccessful, FI unit may require further repair.
11. Allow 15 minutes for warm up
12. Zero the instrument; **Press and Hold the Zero button** (This must be done in clean air)
13. Perform bump test with know gas sample (100ppm methane)
14. Set unit to search range to begin survey
15. Adjust alarm set point to as sensitive as practical

### 2.2 LEAKAGE SURVEY (192.723)

- A. The operator shall conduct a gas detector leakage survey of all exterior pipeline facilities of the operators system at the following intervals:
1. Business District: Once each calendar year not to exceed 15 months.
  2. Outside of Business Districts: As frequently as necessary but at intervals not exceeding 5 years. It is recommended that the operator survey a minimum of 20% of its system each year with the entire system to be completed within 5 years.

- B. Leakage surveys and leakage grading shall be performed by qualified personnel.

Grade 1 leak: Requires immediate and continuous action until corrected.

Grade 2 leak: Shall be scheduled for repair as soon as practical and shall be reevaluated at a minimum of every 30 days.

Grade 3 leak: Shall be scheduled for repair as soon as practical and shall be reevaluated at a minimum of every 12 months.

**(Refer to Section J-5)**

- C. Operator and contract personnel conducting leakage surveys shall check calibration

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on the F.I. units (according to the operator's manual) each day they are used and document the results.

- D. Proper field use of the instrument to conduct a leakage survey should be as follows:
1. When surveying, the range switch should be on its most sensitive range.
  2. The technician should be looking for gas vent points and not necessarily limited to the area directly over the main. In many cases the main is located in a paved street where no gas vent points are nearby. The technician should search out all adjacent cracks and other surface structures, such as water meter boxes adjacent to the gas main or service to be inspected.
  3. On lawns or unpaved areas, the operator will survey directly over the main to get best results. On testing around exposed piping, such as gas meters, the operator should not specifically test each fitting, but slowly wave the test probe over the meter set.
  4. Paved areas and areas with water puddles will not vent freely. A meter movement indicates the presence of hydrocarbons, especially one that activates the audio signals by exceeding a preset threshold level. When this occurs the operator must backtrack several feet and re-inspect the area (being careful to reproduce the previous inspection exactly) in order to define the actual venting point of the leakage indication. The magnitude of the meter response may suggest a temporary reduction in sensitivity so that more accurate centering may be accomplished. At this point, the soil atmosphere shall be tested with a conventional, combustible gas indicator. It must be kept in mind that both the paving and surface opening are apt to greatly influence the amount of gas in the atmosphere. Although paving will reduce the concentration, street openings will tend to increase it beyond that level, which normal venting through the soil would produce.
  5. In other areas where motor vehicle traffic is prevalent, or where other exhaust producers are present, the possibility exists of meter indications occurring which have no relationship to the hydrocarbon-carrying lines being inspected; however, since contaminants are rarely found in detectable concentrations at the surface when an inspection is being done, false indications have not been a problem. The retracing procedure will quickly confirm the existence of hydrocarbons.
  6. Indications of the presence of hydrocarbons detected by the F.I. unit will cause the technician to place bar holes so that the presence of hydrocarbons can be confirmed by the use of the Combustible Gas Indicator, CGI. Enough bar holes shall be placed to determine the amount of leakage and the extent of the area in which leakage is present and to determine the grade of leak

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#### 2.2 SAMPLING PRECAUTIONS

- A. The flame ionization unit is not to be used as a measuring device and is not to be used in manholes or confined areas to measure for explosive gas. A combustible gas indicator (CGI) should be used for this purpose. The readings obtained with a flame ionization unit are not accurate above 400 parts per million. It may flame out, at or near the lower explosive limit.
- B. The flame ionization unit is designed as a surface sampling instrument.
- C. When a scheduled leakage survey is conducted using the hand held portable flame ionization unit, the technician of this unit shall record the wind velocity every 2 hours using an appropriate wind velocity gauge. Leakage survey may become ineffective in wet or windy conditions. The technician's good judgment should be used to determine an adequate survey. Whenever the wind velocity is in excess of 20 miles per hour, the scheduled leakage survey shall be discontinued.
- D. Whenever a scheduled leakage survey is conducted by the mobile unit, the technician of this unit shall record the wind velocity on the appropriate leak survey form every 2 hours by using a wind velocity gauge. The wind velocity readings shall be taken within 3' of ground level. Whenever the wind velocity is in excess of **10** miles per hour, the scheduled survey shall be discontinued.
- E. In addition to heavy winds, the unit should not be used in heavy rains or where there is standing surface water on the pavement or areas to be surveyed. Water may damage the unit, and will tend to temporarily seal the gas vent points. The unit can however, be used in light rain and where this buildup has not occurred.