SECTION 23 8500 - GAS DETECTION SYSTEM PART 1 - GENERAL

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| 1.1 |  | RELATED DOCUMENTS |
|  | A. | Drawings and general provisions of the Contract, including General and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section. |
| 1.2 |  | SUMMARY |
|  | A. | Provide a complete installation of a toxic gas detection system to protect the designated area from harmful gas build up. System to include stand-alone sensors and audible/visual alarm devices to communicate the state of the alarm condition to BMS or Fan activation systems. |
|  | B. | The system shall include, but not be limited to, the following:   1. Future expandability 2. Gas Valve and Electrical Power Control Circuits 3. Display of Gas Supply and Alarm Status 4. Remote Detectors 5. Remote Audible Alarm Beacons 6. Remote Panic Buttons 7. Relay Outputs 8. Re-Set and Mute Functions |

PART 2 - PRODUCTS

* 1. Control Panel type CGS GDP2X
     1. The control panel will be 120 Vac powered, individually powering and accepting the inputs of multiple remote detectors. The unit will clearly display the condition of an alarm and provide a re-set and mute function. The unit shall provide a fascia mounted panic button, recessed to avoid accidental shut downs. Mount the panel at AFF. 48”
     2. The control panel will be capable of transmitting alarm conditions to a BMS system.
     3. For local activation of fans or louvers (or other equipment), the relay will change state in alarm and revert back once the alarm has been reset.
     4. The control panel will be capable of operating within relative humidity ranges of 5-95% non- condensing and temperature ranges of -4° F to 140° F (-20° C to 60° C).
     5. The unit will accept up to eight (8) remote detectors although less may be required for designated detection area.
     6. For local activation of audible alarms, the transmitter shall have an on-board device able to generate an audible output of 85 dBA @ 10 ft.
     7. The unit shall provide 24v output signals to activate remote audible alarm beacons with in-built adaptable tones and strobes.

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| GASES | TWA as per Dept of Labor OSHA Guidelines  8hr Avg. Ceiling Limit Instantaneous  (5mins) Limit | | | MOUNTING HEIGHT | COVERAGE RADIUS |
| Carbon Monoxide  (CO) | 35 PPM | 200 PPM | 500 PPM | 6 ft above finished  floor | 50 ft |
|  | 1st ALARM  SET POINT | 2nd ALARM  SET POINT | 3rd ALARM  SET POINT | MOUNTING HEIGHT | COVERAGE  RADIUS |
| Methane | 8% of LEL  4% of VOL | 10% of LEL  5% of VOL |  | 2ft from ceiling | 50 ft |

* + 1. Detector alarm levels are to be activated and the unit is to be installed in accordance with the following parameters:
    2. Local Building Codes recommendations take precedence over these parameters. Coverage can differ depending on application.
  1. ACCESSORIES
     1. Detectors CGSCOTFT & CGSNGTFT

1. Carbon Monoxide and Methane detectors shall be mounted on single gang rough in box in   
 polycarbonate enclosures allowing access for maintenance and testing. Detectors shall provide clear

power and alarm condition and current ppm or %LEL via TFT digital screen. Detectors shall

provide a clear traffic light display changing from green, to yellow to red. Red being full alarm.

Detectors shall provide integral test function and come factory tested and calibrated.

* + 1. Strobe and Horn type CGSAAB
       1. Strobe & Horn unit will be capable of operating within relative humidity ranges of 0- 100% and temperature ranges of -30° F to 150° F (-35° C to 66° C). Rating of horn will be no less than 72 dBA at 10 feet. Intensity of light will be no less than 40W and will flash at a frequency of 1 per second. Unit will be certified and listed to ANSI/UL safety standards.
    2. Detector Guards type CGSGUARD
       1. The grid is made of a 9-gauge steel wire. The guard must be designed to allow calibration without removing the guards.
    3. Remote Panic Button type CGSEBOTW

1. Panic Button will be constructed of tough polycarbonate with a stainless   
 steel back plate capable of operating within relative humidity ranges of   
 0-100% and temperature ranges of -40° F to 250° F (-40° C to 121° C).

Unit will be clearly labeled “EMERGENCY BOILER SHUT-OFF” with   
 5/8” black text on yellow background with red mushroom type button.   
 Unit will be certified and listed to UL safety standards and be ADA   
 compliant.

PART 3 - EXECUTION

* 1. INSTALLATION
     1. Install hazardous gas monitoring equipment including sensors, audible alarms, as shown on Contract Drawings, and as recommended by manufacturer of equipment, and as required by authorities having jurisdiction.
     2. Install conduit and wiring from sensors to control panel and to the fan starters/ HVAC control panel as recommended by manufacturer of equipment.
  2. SEQUENCE OF OPERATION
     1. If any CO sensor detects Carbon Monoxide, the detector shall indicate Low Alarm level, it’s screen shall turn yellow and the corresponding line on the gas detection panel screen shall show the change of state. If CO levels continue to rise or trigger alarm thresholds as per the OSHA Dept of Labor TWA alarm thresholds the detector shall indicate High Alarm level, it’s screen shall turn red and the detector shall emit an audible alarm. The detector’s alarm level shall signal the gas detection panel to alarm, the main panel shall show High Alarm, indicate which detector and at what alarm level it had alarmed, the panel shall emit an audible alarm, signal a remote strobe & horn, relay outputs shall change state. The main panel shall de-energize the power output to the gas valve and electrical contactor isolating the gas supply to the boiler room and the electrical power to the appliances.
     2. If any Methane Sensor detects 8% of LEL gas, the detector shall indicate Low Alarm level, its screen shall turn yellow and the corresponding line on the gas detection panel screen shall show the change of state. If the gas level reaches 10% of LEL the detector shall indicate High Alarm level, its screen shall turn red and the detector shall emit an audible alarm. The detector’s alarm level shall signal the gas detection panel to alarm, the main panel shall show High Alarm, indicate which detector and at what alarm level it had alarmed, the panel shall emit an audible alarm, signal a remote strobe & horn, relay outputs shall change state. The main panel shall de-energize the power output to the gas valve and electrical contactor isolating the gas supply to the boiler room and the electrical power to the generator.
     3. The main panel shall provide a Mute function that will disable the audible alarms but will not interfere with the BMS or F.A.C.P. outputs or re-energize the gas valve and electrical power outputs.
     4. The main panel shall provide a Re-Set function that will re-energize the gas valve and electrical power outputs allowing the gas supply and the appliances to resume. The Re-Set function shall only be permitted by the main panel if all detectors are reporting a clean and safe condition.
  3. COMMISSIONING
     1. After installation, test equipment to demonstrate operation of functions described above under sequence of operation by manufactures certified service technician.
     2. Provide testing kits (including gas bottles) for testing and calibration by Commission technician.
  4. WARRANTY.
     1. Limited Warranty
        1. Canadian Gas Safety, Inc. warrants to the original purchaser and/or ultimate customer ("Purchaser") of CGS products ("Product") that if any part thereof proves to be defective in material or workmanship within thirty six (36) months, such defective part will be repaired or replaced, free of charge.

END OF SECTION 28 3500