

SECTION 233516 - ENGINE EXHAUST SYSTEMS

PART 1 - GENERAL

1.1 SUBMITTAL REQUIREMENTS

A. Product Data

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. Clearly state equipment markings (i.e. AHU-1), capacities, voltages and model numbers on all submittals.

B. Shop Drawings

1. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Include diagrams for power, signal, and control wiring.

PART 2 - PRODUCTS

2.1 CARBON MONOXIDE / NITROGEN DIOXIDE DETECTION

A. Manufacturers.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acme Engineering Products, Inc.
 - b. Brasch
 - c. Critical Environmental Technologies
 - d. Kelly
 - e. MSA

B. Supply, install and connect a monitoring system as indicated on the drawings and schedules to control the accumulation of diesel fumes in the monitored space.

C. Equipment shall include the following:

1. Remote sampling heads with high-efficiency cartridge filters for space mounting.
2. Sampling pump assembly and flow indicator for each sampling point.
3. CO modules complete with CO sensor sampling chambers for each sampling point. CO modules shall be fully electronic incorporating solid state circuitry,

with plug-in electronic board, factory calibrated to operate at 25 ppm and 100 ppm CO. Electronic board shall incorporate LED visual indicators. Sensor and electronics shall include necessary temperature compensating circuits.

4. Sensor response time in the order of a few minutes to avoid frequent or unnecessary start-ups of ventilation equipment due to short temporary conditions.
 5. 3-way solenoid valve assembly to divert airflow from the sampling pumps into the CO₂/NO₂ analyzer according to the programmed CPU sequence.
 6. Non-dispersive CO₂ infra red analyzer technology or NO₂ electrochemical cell.
 7. Central Processor Unit with memory for programming, value storage, display and outputs.
 8. Output relay boards with two operating and one alarm output for each sampling point.
 9. Locking type enclosure with no adjustments accessible from the outside.
 10. Visual status indicators on enclosure door. One set for each sampled point.
- D. Control Panel shall contain a single 120 volt/ single phase dedicated circuit (on emergency power if applicable) and a dedicated ground line.
- E. Unit shall display the following:
1. Flow indicators confirming air is flowing to the CO sensors and CO₂ analyzer or NO₂ electrochemical cell.
 2. "LED" display shall indicate CO₂/NO₂ location in sampling stage.
 3. LED's for "ON-OFF" light up when relays are energized.
 4. Digital display continuously indicates location number and CO₂/NO₂ value of all points sampled on fast sequence.
- F. Operation:
1. Individual sampling pumps shall run continuously bringing updated air samples to the control panel.
 2. For CO₂/NO₂ detection, each point (location) shall be sampled sequentially according to the CPU. The dwell time per point shall be fixed at 60-90 seconds. At the end of each dwell time the CPU shall acquire an updated CO₂/NO₂ for that point from the infra red CO₂ analyzer or NO₂ electrochemical cell.
 3. The CO₂/NO₂ output of each point shall be defined by the "LOW", "HIGH" and "ALARM" level user adjustable control level settings on the CPU.
 4. For CO detection, all points shall be sampled simultaneously .
 5. The output of each CO module shall be defined by the calibrated "LOW", "HIGH" and "ALARM" control levels on each module.
- G. Systems Operational Control:
1. Description for each HVAC or similar system what the outputs of the Air Quality Monitor should achieve:
 - a. Control of Fans
 - b. Control of speed of Fans

- c. Control of Fan Capacity
- d. Control of ON-OFF Dampers
- e. Control of Modulating Dampers
- f. Information to BAS
- g. Activation of ALARM circuits
- h. Providing record of air quality in spaces

PART 3 - EXECUTION

3.1 INSTALLATION OF VOC DETECTION SYSTEMS

- A. Install per manufacturer's recommendations. Provide all accessories and devices for a complete VOC detection system as outlined on the drawings and specified herein.
- B. Gas transmitters must be installed in a true daisy chain with an end of the line resistor on the last transmitter.
- C. For local activation of fans or louvers (or other equipment) an on-board DPDT relay 5 A, 30 VDC or 250 VAC (resistive load) will be activated at programmable set points (and programmable time delays) through the control panel. An LCD display will provide gas concentration readings.
- D. Transmitter will be capable of operating within relative humidity ranges of 5-95% and temperature ranges of -4° F to 104° F.
- E. The transmitter should have a plug-in capability for a gas cartridge with a smart sensor capable of self-testing.
- F. 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.
- G. Detector alarm levels are to be activated and the unit is to be installed in accordance with the following parameters:

TOXIC GASES	SET POINT	MOUNTING HEIGHT*	COVERAGE AREA
Carbon Monoxide (CO)	25 PPM	5 ft above finished floor	5,000 sf
Nitrogen Dioxide (NO2)	25 PPM	5 ft above finished floor	5,000 sf
Methane (CH4)	25% LEL	5 ft above finished floor	5,000 sf
Other VOC's	1,000 PPM	5 ft above finished floor	5,000 sf

*Local Building Codes recommendations take precedence over these parameters. Coverage can differ depending on application.

*Manufacturer mounting heights to take precedence over these default values.

3.2 CALIBRATION KIT

- A. Provide a manufacturer recommended calibration kit for each gas detection system to properly check the response of the gas sensors and gas detection instrumentation.

END OF SECTION 233516