Guide Specification

**Multi-Zone Ventilation Control System for Enclosed Parking Garages**

1. **Overview and Scope**The Ventilation Control System (VCS) shall consist of gas sensors located throughout the garage and a central controller which continuously monitors the gas values and executes a pre-defined fan control strategy.

To ensure the long-term performance of the system, a service due date shall be assigned to every sensor in the system. At the service due date, each sensor shall visually indicate its need for service and the gas controller shall activate the effected zone’s ventilation (fail-safe).

Recognizing that this is a life safety application, the system shall be third-party certified to UL 2075, EN 50545-1, or an equivalent performance standard, must be certified to UL safety standard 61010-1 / CSA22.2, and the manufacturer must be certified to the ISO-9001 quality standard.
2. **Gas Sensors**
	1. CO / NO2 sensors shall be placed throughout the garage such that there are at least 1 sensor for each [7,500 / 5,000] square feet of enclosed parking or as required for compliance with local codes and regulations. Additional sensors shall be placed as necessary to ensure adequate coverage in alcoves and other areas with limited air movement.
	2. To minimize installation cost, carbon monoxide sensing and nitrogen dioxide sensing must be integrated into a single transmitter device.
	3. To facilitate lifecycle maintenance, all sensor elements must be integrated into smart sensor modules. The sensor modules must be field replaceable without special tools. Each sensor module must store its calibration history and next service due date.
	4. All devices must be rated NEMA4X / IP65 to insure sufficient protection from dust and moisture in the garage.
	5. Gas sensors shall meet all performance specifications including accuracy and repeatability in environments between 5 and 122 degrees Fahrenheit with relative humidity between 15 and 90% (non-condensing).
	6. Carbon monoxide and nitrogen dioxide sensors must be electrochemical type. Combustible sensors must be pellistor type.
	7. Every sensor /transmitter shall include a single, dual- or multi-colored LED plus an audible horn to indicate sensor status. Because they can attract tampering or vandalism, sensors with an alpha-numeric display are not acceptable.
3. **Gas Controller**
	1. General
	The gas controller must be intended specifically for parking garage ventilation control applications. All parameters including sequence of operation must be entered using embedded menus. General purpose devices that are custom programmed for this application, including the facility’s building management system, will not be accepted unless the hardware/software combination has been third party certified to EN50271 (Electrical apparatus for the detection and measurement of combustible gases, toxic gases and oxygen – Requirements and tests for apparatus using software and/or digital technologies).
	2. The controller shall provide a continuous, scrolling display of all gas values with a visual indication of values that are in alarm.
	3. A password shall be required to change all system parameters.
	4. The controller must be rated NEMA 4X and operate between 23 and 104 degrees Fahrenheit and 15 to 90% rH (non-condensing).
	5. The controller must include an audible horn (minimum 85 dB) to annunciate alarms and system faults.
	6. Optional: [The gas controller must include a {BACnet-IP } interface port such that the building management system can read the gas values in real time.]
	7. Optional: [The gas controller must include a data logging function to record gas values, alarm occurrences and system fault occurrences.]
4. **Fan Activation and Control**
	1. The system shall support on/off and variable speed fan control.
	2. The system shall support ventilation designs using (1) supply and exhaust fans, (2) exhaust fans with supply louvers, (3) ductless systems using axial or induction fans.
	3. The sequence of operation shall allow “zones” to be configured such that the ventilation may be controlled in response to the maximum or average gas reading within the zone.
	4. [Exhaust fans are to be activated at low speed when the maximum value of any sensor in that fan’s area of ventilation reaches 25 ppm CO, 2 ppm NO2, or 20% LEL and the fan shall be increased to full speed if the maximum gas value in the zone reaches 50 ppm CO, 4 ppm NO2 or 40% LEL.]
	5. [The variable speed fans shall be set to 25% speed when the maximum value of any sensor in that fan’s area of ventilation reaches 25 ppm CO, 2 ppm NO2, or 20% LEL and the fan shall increase until it reaches full speed if the maximum gas value in the zone reaches 50 ppm CO, 4 ppm NO2 or 40% LEL.]
5. **California Title 24 Compliance**
	1. The system must be fully compliant with the California Title 24 Building Energy Efficiency Standards section 120.6(c) “Mandatory Requirements for Enclosed Parking Garages” including the creation of multiple ventilation zones and the garage occupancy schedule; different sequences of operation during occupied and unoccupied periods; and different sensor fault detection criteria during occupied and unoccupied periods.
6. **Installation and Commissioning**
	1. The system shall be installed and commissioned according to the manufacturer’s recommendations.
	2. The commissioning contractor shall provide a riser drawing showing the layout of the system and identifying the individual identifier/address of each component in the system. The riser drawing shall also include the project-specific sequence of operation.
	3. The commissioning contractor shall provide a written report certifying that all devices are operational and the design sequence of operation is fully functional.
7. **Approved Manufacturer**
	1. The parking garage ventilation and control system shall be the PolyGard 2 Series by INTEC Controls (12700 Stowe Drive, Poway, CA, 92064, 858-578-7887, www.inteccontrols.com) or approved equal.