

PART 1 - GENERAL

- 1.1 REFERENCES .1 ASME.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)  
.1 Material Safety Data Sheets (MSDS).
- .3 Underwriters Laboratories' of Canada (ULC).
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:  
.1 Submit manufacturer's instructions, printed product literature and data sheets for garage systems equipment and include product characteristics, performance criteria, physical size, finish and limitations.  
.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:  
.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Newfoundland and Labrador, Canada.  
.2 Indicate on drawings:  
.1 Equipment including connections, piping and fittings, valves, strainers, control assemblies and ancillaries, identifying factory and field assembled.  
.2 Complete wiring diagrams including schematics.  
.3 Dimensions, construction details, materials, recommended installation and support, mounting bolt holes, sizes and locations, and point loads.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
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1.2 ACTION AND  
INFORMATIONAL  
SUBMITTALS  
(Cont'd)

- .5 Sustainable Design Submittals:
  - .1 LEED Canada submittals: in accordance with Section 01 35 21 - LEED Requirements.
  - .2 Construction Waste Management:
    - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
  - .3 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
    - .4 Regional Materials: submit evidence that project incorporates required percentage 30 % of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.3 CLOSEOUT  
SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for garage systems equipment for incorporation into manual.
- .3 Submit 2 copies of operation and maintenance manual.

1.4 QUALITY  
ASSURANCE

- .1 Regulatory Requirements: Work to be performed in compliance with applicable Provincial/Territorial regulations.
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- 1.5 DELIVERY,  
STORAGE AND  
HANDLING
- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
  - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .3 Storage and Handling Requirements:
    - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
    - .2 Store and protect equipment from nicks, scratches, and blemishes.
    - .3 Replace defective or damaged materials with new.
  - .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21 - LEED Requirements.
  - .5 Packaging Waste Management: remove for reuse or return of pallets, crates, padding, banding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.

PART 2 - PRODUCTS

- 2.1 HAZARDOUS GAS  
DETECTION SYSTEM
- .1 Provide a complete and functional gas detection and alarm system for monitoring of hazardous gases from vehicle exhaust, including carbon monoxide and nitrous oxide. Provide a packaged system with all components from a single manufacturer and complete with all options and accessories as indicated and as required for a fully functional system. All systems and components to be CSA listed.

- 2.1 HAZARDOUS GAS DETECTION SYSTEM  
(Cont'd)
- .2 Wall mount carbon monoxide/nitrous dioxide monitoring system with remote mount sensor/transmitters.
  - .3 The carbon monoxide monitoring system shall measure carbon monoxide and nitrous dioxide. The system shall provide audible and visual alarms when preset limits are exceeded.
  - .4 The number of monitoring sensors shall be as indicated on the drawings.
  - .5 The system shall consist of a dual channel control monitor panel in a wall mount enclosure and corresponding solid state Carbon Monoxide transmitter/sensor and electrochemical nitrous oxide sensor/transmitters. The sensor/transmitters shall be capable of being located remote from the monitor by up to 1000/5000 feet dependent upon wire gauge. The transmitter/sensor shall receive power from and send signals to the control panel, corresponding to carbon monoxide/nitrous dioxide concentrations.
  - .6 The monitor shall be of the NEMA 4X wall mount type.
    - .1 Power ON/Off switch and LED indicator.
    - .2 Test/Reset function switch.
    - .3 Independently settable Low and High Alarm levels.
    - .4 5 amp, DPDT Relays (High, Low, Fault), c/w Programmable Time Delay Circuitry (Make & Break).
    - .5 LED Indication of High, Low and Sensor Fault.
    - .6 Setpoint/Span Adjustment.
    - .7 Audible Alarm.
  - .7 As a minimum, the sensor/transmitters shall be enclosed in NEMA 1 enclosures.
  - .8 Carbon Monoxide Wiring: The interconnect wiring shall be 3-wire shielded cable.
    - .1 Signal: transmitter/sensor signal shall be 0-10 VDC or 4-20 mA current signal.
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2.1 HAZARDOUS GAS  
DETECTION SYSTEM  
(Cont'd)

- .9 Nitrous Oxide Wiring: The interconnect wiring shall be 2-wired shielded cable.
  - .1 Signal: transmitter/sensor signal shall be 0-10 VDC or 4-20 mA current signal.
- .10 Sensors used as part of the monitoring system shall be in accordance with the following:
  - .1 Carbon monoxide sensor/transmitter units with a range of 0-200 PPM CO in vehicle exhaust. Nitrous oxide with a range of 0-6 PPM N<sub>2</sub>O". The sensing elements shall be electrochemical (CO) and electrochemical (N<sub>2</sub>O") and require only once per year calibration maintenance (CO) and quarterly (NO").
  - .2 Alarm setpoint levels: Three separate alarm setpoints shall be provided on a per channel basis for "Low Alarm", "High Alarm", and "Fail".
- .11 Each controller module shall provide an audible alarm when alarm condition occurs.
- .12 The system shall operate on 115 VAC, 60 Hertz.
- .13 The system shall require no periodic maintenance other than once per year gas calibration verification CO and minimum quarterly for N<sub>2</sub>O". This procedure shall be capable of being accomplished by one person.
- .14 Locate control monitor panel as indicated on the drawings. Attach sensors to structure where indicated on drawings. Provide wiring and conduit between all sensors and the monitoring panel. Conduit shall conform to the requirements of Division 26. Consult factory for recommended sensor locations and system configuration.
- .15 Acceptable manufacturers: QEL, Armstrong Monitoring.

PART 3 - EXECUTION

- 3.1 EXAMINATION .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for garage systems equipment installation in accordance with manufacturer's written instructions.  
.1 Visually inspect substrate in presence of Departmental Representative.  
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.  
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 INSTALLATION .1 Install Hazardous Gas Detection System (HGDS) as indicated and to manufacturers instructions.
- 3.3 IDENTIFICATION .1 Install permanently marked identification tags on sensors and HGDS components/panels.
- 3.4 CLEANING .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.  
.1 Leave Work area clean at end of each day.  
.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.  
.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.
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3.4 CLEANING  
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- .3 Waste Management:(Cont'd)
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.