



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 391-2009

SUPPLY AND DELIVERY OF A GAS DETECTION SYSTEM

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 SUPPLY AND DELIVERY OF A GAS DETECTION SYSTEM

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, June 9, 2009.

B2.2 Bids determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.

B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. ENQUIRIES

B3.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

B3.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall promptly notify the Contract Administrator of the error, discrepancy or omission at least five (5) Business Days prior to the Submission Deadline.

B3.3 If the Bidder is unsure of the meaning or intent of any provision therein, the Bidder should request clarification as to the meaning or intent prior to the Submission Deadline.

B3.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B3.5 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B3.6 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

B4. ADDENDA

B4.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.

B4.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B4.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>

B4.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B4.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 8 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B5. SUBSTITUTES

- B5.1 The Work is based on the materials, equipment, methods and products specified in the Bid Opportunity.
- B5.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B5.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least seven (7) Business Days prior to the Submission Deadline.
- B5.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the material, equipment, method or product as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the Contract;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the Contract.
- B5.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B5.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.
- B5.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.
- B5.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B5.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B13.
- B5.9 No later claim by the Contractor for an addition to the price(s) because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.
- B5.10 Notwithstanding B5.2 to B5.9, and in accordance with B6.7, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B13.1(a).

B6. BID SUBMISSION

- B6.1 The Bid shall consist of the following components:

- (a) Form A: Bid;
 - (b) Form B: Prices.
- B6.2 Further to B6.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B5.
- B6.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely in ink, to constitute a responsive Bid.
- B6.4 The Bid Submission may be submitted by mail, courier or personal delivery, or by facsimile transmission.
- B6.5 If the Bid Submission is submitted by mail, courier or personal delivery, it shall be enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address, and shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1
- B6.5.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid Submission.
- B6.6 Bidders are advised not to include any information/literature except as requested in accordance with B6.1.
- B6.7 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B13.1(a).
- B6.8 If the Bid Submission is submitted by facsimile transmission, it shall be submitted to (204) 949-1178.
- B6.8.1 The Bidder is advised that the City cannot take responsibility for the availability of the facsimile machine at any time.
- B6.9 Bids submitted by internet electronic mail (e-mail) will not be accepted.
- B7. BID**
- B7.1 The Bidder shall complete Form A: Bid, making all required entries.
- B7.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B7.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B7.2.
- B7.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

- B7.4 Paragraph 10 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers;
 - (d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

B7.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.

B7.4.2 All signatures shall be original.

B7.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B8. PRICES

B8.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B8.1.1 Prices on Form B: Prices shall include:

- (a) duty;
- (b) freight and cartage;
- (c) Provincial and Federal taxes [except the Goods and Services Tax (GST) and Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable] and all charges governmental or otherwise paid;
- (d) profit and all compensation which shall be due to the Contractor for the Work and all risks and contingencies connected therewith.

B8.1.2 Prices on Form B: Prices shall not include the Manitoba Association for Resource Recovery Corporation (MARRC) Environmental Handling Charge (EHC) which shall be extra where applicable.

B8.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.

B8.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B9. QUALIFICATION

B9.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Bidder does not carry on business in Manitoba, in the jurisdiction where the Bidder does carry on business; and
- (b) be financially capable of carrying out the terms of the Contract; and
- (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

- B9.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/debar.stm>
- B9.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) have successfully carried out work similar in nature, scope and value to the Work; and
 - (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
 - (c) have a written workplace safety and health program, if required, pursuant to The Workplace Safety and Health Act (Manitoba);
 - (d) be a factory trained representative to calibrate, start up and commission system.
- B9.4 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.
- B9.5 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B10. OPENING OF BIDS AND RELEASE OF INFORMATION

- B10.1 Bids will not be opened publicly.
- B10.2 Following the Submission Deadline, the names of the Bidders and their total bid prices (unevaluated, and pending review and verification of conformance with requirements or evaluated prices) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt>
- B10.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract Amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt>
- B10.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B11. IRREVOCABLE BID

- B11.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 9 of Form A: Bid.
- B11.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work for the time period specified in Paragraph 9 of Form A: Bid.

B12. WITHDRAWAL OF BIDS

- B12.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

- B12.1.1 Notwithstanding C21, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.
- B12.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 10 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B12.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:
- (a) retain the Bid until after the Submission Deadline has elapsed;
 - (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 10 of Form A: Bid; and
 - (c) if the notice has been given by any one of the persons specified in B12.1.3(b), declare the Bid withdrawn.
- B12.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B11.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law.

B13. EVALUATION OF BIDS

- B13.1 Award of the Contract shall be based on the following bid evaluation criteria:
- (a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation therefrom (pass/fail);
 - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B9 (pass/fail);
 - (c) Total Bid Price;
 - (d) economic analysis of any approved alternative pursuant to B5.
- B13.2 Further to B13.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid Submission is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities if the interests of the City so require.
- B13.3 Further to B13.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid or in other information required to be submitted, that he is responsible and qualified.
- B13.4 Further to B13.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.
- B13.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.
- B13.4.2 Further to B13.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.
- B13.5 This Contract will be awarded as a whole.

B14. AWARD OF CONTRACT

- B14.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

- B14.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.
- B14.2.1 Without limiting the generality of B14.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
 - (b) the prices are materially in excess of the prices received for similar work in the past;
 - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
 - (d) only one Bid is received; or
 - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B14.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B13.
- B14.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his Bid upon written request to the Contract Administrator.
- B14.4 Notwithstanding C4 and Paragraph 6 of Form A: Bid, the City will issue a Purchase Order to the successful Bidder in lieu of the execution of a Contract.
- B14.5 The Contract Documents, as defined in C1.1(n) (ii) in their entirety shall be deemed to be incorporated in and to form a part of the Purchase Order notwithstanding that they are not necessarily attached to or accompany said Purchase Order.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for the Supply and Delivery of Goods* (Revision 2008 05 26) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for the Supply and Delivery of Goods* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm
- C0.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Supply of Goods*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

D1.1 In addition to the *General Conditions for the Supply and Delivery of Goods*, these Supplemental Conditions are applicable to the Work of the Contract.

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of the supply and delivery of a gas detection system.

D2.2 The major components of the Work are as follows:

(a) Calibrate, start up and commission gas detection system.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is:

Michael MacDonald
Instrument Technician II
Water and Waste
7740 Wilkes Avenue
Headingley MB R4H 1B8
Telephone No.: (204) 986-5126

D4. NOTICES

D4.1 Notwithstanding C21.3, all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:

The City of Winnipeg
Chief Financial Officer
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9
Facsimile No.: (204) 949-1174

SUBMISSIONS

D5. AUTHORITY TO CARRY ON BUSINESS

D5.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

SCHEDULE OF WORK

D6. COMMENCEMENT

D6.1 The Contractor shall not commence any Work until he is in receipt of a notice of award from the City authorizing the commencement of the Work.

- D6.2 The Contractor shall not commence any Work until:
- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D5;
 - (ii) evidence of the workers compensation coverage specified in C6.16;
 - (b) the Contractor has attended a meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a meeting.

D7. DELIVERY

- D7.1 Goods shall be delivered within forty-two (42) Calendar Day(s) of the placing of an order, f.o.b. destination, freight prepaid to:

Michael MacDonald or designate

7740 Wilkes Avenue WEWPCCThe Contractor shall confirm each delivery with the Contract Administrator or his/her designate, at least two (2) Business Days before delivery.

- D7.3 Goods shall be delivered between 8:30 a.m. and 3:30 p.m. on Business Days.

- D7.4 The Contractor shall off-load goods as directed at the delivery location.

MEASUREMENT AND PAYMENT

D8. PAYMENT

- D8.1 Further to C10, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

D9. PAYMENT SCHEDULE

- D9.1 Further to C10, payment shall be in Canadian funds net thirty (30) Calendar Days after receipt and approval of the Contractor's invoice.

WARRANTY

D10. WARRANTY

- D10.1 Warranty is as stated in C11 unless otherwise specified in Part E.

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B5.

E2. GOODS

- E2.1 The Contractor shall supply a gas detection system in accordance with the requirements hereinafter specified.
- E2.2 Item No. 1 - Controller as follows
- (a) the Microprocessor-based Controller shall be capable of being powered by main power of 120VAC;
 - (b) the controller shall be capable of mounting in a standard 19" instrument Panel;
 - (c) the controller shall be of modular design capable of monitoring 16 channels (sensing heads);
 - (d) the controller must allow viewing of all active channels simultaneously;
 - (e) the controller shall have three levels of programmable alarms per channel, indicated each by a red LED on the front panel;
 - (f) the controller shall have the capability of a re-transmit 4-20mA output per channel;
 - (g) alarms shall be configurable as either high or low alarms;
 - (h) alarm and fault relays shall be mounted on each channel card with a single pole double throw contact rated 240 VAC 5 A;
 - (i) relays shall be configurable energized on alarm or normally energized;
 - (j) relays shall be able to be configured as latching, non- latching, acknowledgeable, non - acknowledgeable and delay latching non acknowledgeable;
 - (k) the display shall have an alphanumeric display giving information on the status, gas concentration, alarm levels, etc. on the front panel, capable of a trend screen, bar graph screen or combination;
 - (l) the channel card shall be field programmable (non-intrusive) for gas, range, and units;
 - (m) all configurations should be done by password- protected software without any potentiometers, jumpers or switches;
 - (n) all data should be kept in non-volatile memory on the card, which shall not have a battery;
 - (o) the controller must be able to communicate with an Infi 90 DCS using Modbus TCP.port; must be able to supply power to 16 detectors.
- E2.3 Item No. 2 – Toxic Gas Detector shall conform to the following specifications:
- (a) the sensor of the gas detector shall be based on electrochemical principle incorporating a 3-electrode design. The transmitter shall be universal to accept any sensor and the measurement ranges shall be user adjustable;
 - (i) measurement range shall be adjustable between:

H2S	0...10 ppm	and	0...100 ppm
CO	0...50 ppm	and	0...1000 ppm

- (b) sensor to be temperature compensated and able to operate within an ambient temperature range of -40°C to 65°C (-40°F to 150°F);
- (c) sensor to operate within ambient humidity conditions of 5 % r.h. to 95 % r.h;
- (d) sensor to contain on-board data memory capability which contains sensor type, part number, serial number, manufacture date and date of initial installation. Additionally it must contain calibration data such as zero, sensitivity and date of last calibration. Transmitter must accept, recognize, and upload calibration data of a remotely calibrated sensor without the need to repeat configuration and/or calibration;
- (e) sensor to have capability for full calibration at a remote location (e.g. instrument shop) and then installed in field transmitters without further calibration required;
- (f) field replacement of sensor to be accomplished without the need to declassify the area or the need to turn off the entire system;
- (g) transmitter to have a two line alphanumeric backlit LCD display with user selectable language options (English);
- (h) the gas detector shall be microprocessor controlled and perform self-diagnostics with error detection and alphanumeric messages displayed on the LCD;
- (i) transmitter to produce 4 to 20 mA output for point-to point connection, HART® signal, or RS 485 digital communication for up to 16 transmitters on one multidrop line;
- (j) notwithstanding C11 the transmitter will have 1.5 year warranty;
- (k) the gas detector should have an option for on-board, user programmable relays;
- (l) transmitter to allow for non-intrusive, one-man, password protected calibration using a handheld remote control, HART handheld terminal, or HART controller;
- (m) during calibration or configuration of the gas detector, a signal shall be transmitted to the central control system indicating that a calibration or configuration is in progress. The signal shall be compatible with standard equipment, not requiring a manufacturer specific interface;
- (n) the gas detector shall meet or exceed the following specifications:
 - (i) Housing Material shall be a copper free aluminum enclosure with polyester powder paint coat (thermally treated);
 - (ii) Signals

Measuring current	4 mA to 20 mA
Under-range	3.8 mA to 4 mA
Over-range	20 mA to 20.5 mA
Fault	< 3.2 mA
 - (iii) Supply Voltage: 10 to 32 V DC;
 - (iv) Power Input 100 mA @ 24 V DC;
 - (v) Relays (optional): 3 SPDT (Alarm 1, Alarm 2, Fault)
Rating: 5A @ 30 V DC, 5A @ 250 V A
 - (vi) Temperature range: -40°C to 65°C (-40 to 150° F)
ATEX: T6 -40 to 65° C
 - (vii) Approvals: Explosion proof UL, CSA
Class I, Div 1, Groups B, C, D
ATEX II 2G EEx d [ia] IIC T6
 - (viii) RFI/EMC: CE marking according to
EN 50081-2 & EN 50082-2 (Industrial Environment) Electromagnetic compatibility (directive 89/336/EEC)
 - (ix) Protection: NEMA 4 + 7, equivalent IP 65
 - (x) Connection: 2 3/4" NPT female conduit entries

- E2.4 Item No. 3 - Infrared Point Combustible Gas Detector shall conform to the following specifications:
- (a) The combustible gas detector shall be based on infrared absorption principle incorporating both a double-compensated optical bench (2 lamps, 2 detectors) and non-focusing optics design. Measurement range shall be 0 to 100% LEL;
 - (b) Sensor to be temperature compensated and able to operate within an ambient temperature range of -40°C to 65°C (-40°F to 150°F).
 - (c) Sensor to operate within ambient humidity conditions of 0 to 100 % r.h., non condensing
 - (d) The gas detector shall be microprocessor controlled and perform self-diagnostics with error detection.
 - (e) Recommended time between calibrations to exceed 24 months.
 - (f) Transmitter to produce 4 to 20 mA output for point-to point connection, HART® signal, or RS 485 digital communication for up to 16 transmitters on one multidrop line.
 - (g) Transmitter to allow for non-intrusive, one-man, password protected calibration using a HART handheld terminal, or HART controller.
 - (h) Calibration/configuration menu language to be user selectable (English).
 - (i) During calibration or configuration of the gas detector, a signal shall be transmitted to the central control system indicating that a calibration or configuration is in progress. The signal shall be compatible with standard equipment, not requiring a manufacturer specific interface.
 - (j) Notwithstanding C11 the transmitter will have 5 year warranty.
 - (k) The gas detector shall meet or exceed the following specifications:
 - (i) Housing Material: Stainless steel SS316
 - (ii) Signalls
 - Measuring current 4 mA to 20 mA
 - Under-range 3.8 mA to 4 mA
 - Over-range 20 mA to 20.5 mA
 - Fault <1.2 mA
 - (iii) Supply Voltage: 15 to 32 V DC
 - (iv) Temperature range: -40°C to 65°C (-40 to 150° F)
 - (v) Approvals: Explosion proof UL, CSA
Class I, Div 1, Groups B, C, D
ATEX II 2G EEx d [ia] IIC T5, Tamb -40 to 65° C
 - (vi) RFI/EMC: CE marking according to:
EN 50081-2 & EN 50082-2 (Industrial Environment)
Electromagnetic compatibility (directive 89/336/EEC)
 - (vii) Protection: IP 66 & IP 67 (NEMA 4 + 7)
 - (viii) Connection: UL/CSA version: $\frac{3}{4}$ " NPT male threat,
ATEX version: M 25 x 1.5
- E2.5 Item No. 4 - The Contractor must supply eight (8) hours of commissioning and start up time by qualified personnel.