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| Version | Date | Description of Revisions |
| 1 | November 1, 2011 | Standard Specification Release |
| 2 | April 17, 2015 | General Formatting |
| 3 | June 13, 2022 | 1.4 Tagging requirement revised (BM) |
|  |  |  |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

**For each project the Consultant is responsible for the correct application of the specifications and for updating and modifying all highlighted items, as well as updating and modifying those sections that are directly applicable to the project. All updates and modifications to this standard document are to be highlighted to the Region for review and acceptance on each project.**

**Notice:** This Document hardcopy must be used for reference purpose only.

**The on-line copy is the current version of the document.**

# GENERAL

## General

### The specifications in this section define additional requirements to those set forth in Section 13105 – Process Control: General Instrumentation Requirements. Where a conflict exists, the more stringent requirement is to be provided.

### The Contractor is to clearly identify on the shop drawings any deviation from the specification.

### Contractor required to provide the following O&M documentation: manufacturers’ printed O&M documentation; installation instructions; specifications; operation manuals, including electrical drawings, and plumbing diagrams; sales literature; materials; and training materials as applicable.

### Contractor is to furnish copies of the manufacturer’s warranties.

### Contractor is to provide, through the Instrumentation Supplier, gas detectors, complete and operable, in accordance with the Contract Documents.

## Measurement and Payment

### The work outlined in this section shall be included in the lump sum price for Section 13190 – Gas Detectors as indicated in the Bid Form.

## Sensor

### Sensors are to be provided for each gas to be monitored, as a minimum H2S, O2 and CH4.

### Sensors:

#### Catalytic Bead Sensor Type: Poison-resistant combustible gas sensor.

#### Infrared Point Sensor Type: Point Type Infrared Absorption.

#### Infrared Open Path Sensor Type: Open Path IR Source / Receiver Type Infrared Absorption.

### Calibration: Provide Tygon Tubing for one man non-intrusive calibration.

### Mounting: Surface / Conduit mounting on 8 meter centers.

### Cable Type: As recommended or provided by the manufacturer.

### Power: Obtained from transmitters via interconnecting cable.

### Compensation: Temperature / Pressure / Humidity.

### Material: Stainless Steel or Copper Free Aluminum

### Sensor Life: 8 months minimum usable life from time of successful commissioning.

### Where both Catalytic Bead and Infrared technologies are available, Infrared is to be provided.

### Infrared technology to be used always for LEL.

## Transmitter

### Use in applications where a single or up to three sensors are required.

### Local backlit LCD display of % LEL with additional indicators for alarms and status conditions, minimum 12 mm high characters. Front of enclosure display, readable from 3 meters.

### Non-intrusive set-up and calibration from user programmable and/or predetermined choices, accessible from menu prompts.

### One 4-20mA @ 600 Ω analog output.

### Three alarms with adjustable set-points, isolated output SPDT contacts, 5 amp 120 VAC per channel.

### NEMA 4X / NEMA 7 corrosion resistant housing and mounting hardware.

### Up to three sensors installed for each transmitter.

### Equipment tag wired to transmitter and to sensors in accordance with Section 01080 – Process Equipment Location Tagging.

## Sample Pump

### In sample areas that are remote, inaccessible, too hot or too cold for direct sensor monitoring, sample pump is to be used to draw gas sample from monitored area through sample line to gas sensor.

### Sample pumps are to be utilized in the following locations:

#### Wetwell.

# INSTALLATION

## General

### The following installation requirements are in addition to or deviations from the requirements set forth for instrumentation in Section 13105 – Process Control: General Instrumentation Standard.

#### Locate the sample point to minimize unnecessary delay time in the LEL measurement. Take care to ensure the sample is representative of the surrounding atmosphere, and not in dead air.

#### Mount sensors for each application as per manufacturers installation recommendations and accessible for routine maintenance and calibration.

#### Mount the transmitter unit at 1.8m off the floor in a readily accessible location to facilitate maintenance and calibration.

#### Use infrared point sensors in areas of high humidity and in areas with high levels of contamination.

#### Use infrared open path sensors in tunnels and across large open rooms.

#### Mount sensors on 8 meter diameter centers.

#### Manufacturer mounting brackets to be used for installation.

#### Provide three (3) alarm outputs minimum to be wired as followed:

##### Alarm 1: To PAC.

##### Alarm 2: To Alarm lamp outside building/room.

##### Fault: To PAC.

#### Provide No Flow alarm output from sample pump to PAC.

#### Provide remote (outside of the area being monitored) indication of the combustible gas monitoring point in alarm on multiple sensor installations.

#### Provide a sealed external push-button alarm reset and audio alarm silencing. To be determined by the operational requirements

#### Provide zero and span gas, remote testing connection, and portable calibration kit c/w carrying case to allow for one man non-intrusive calibration. Gas to be utilized prior to expiry – current to within one (1) month.

#### Do not paint the sensors.

#### Provide the interconnecting wiring between the sensors and transmitter/controller units in rigid conduit, following the OESC for Class I-Division 1 areas (explosion proof).

#### Ensure that the system is on-line 24 hours before start up and calibration for adequate warm up.

#### Provide a one (1) year supply of consumables and spare parts.

#### Sensors are not to be ordered until prior to proposed site start up. Sensor and consumables must be supplied with 12 months of operating life after substantial completion. Sensors/consumables with less than 12 months operating life will be replaced by the Contractor at no expense to the Region.

#### Instrument supplier is to supply their own calibration gas and calibrators for instrument start up.

#### Transmitter/Electronics not mounted/installed indoors must be installed within fiberglass enclosure with viewing window, thermostat and heater. Panel heater to be powered from separate lighting panel circuit than instrument.

# ACCEPTABLE MANUFACTURERS

### Acceptable manufacturers are listed in the following table in order of preference. The design has been completed around the first named supplier. The contractor is responsible for all costs associated with any changes required to the design to accommodate one of the other manufacturers.

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| --- | --- | --- |
| Preference | Manufacturer | Model |
| 1 | MSA | Ultima X |
| 2 | Scott Health & Safety | Freedom 6000 |
| 3 |  |  |

### The Contractor is to select the appropriate options to suit the application and the requirements of the specification.

### Where second and third named manufacturers are provided, they are to meet the performance specifications of the first named manufacturer.

## Gas Detection

### First Named Manufacturer:

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| --- | --- | --- |
| **Service:** | Catalytic Bead | Catalytic Bead |
| **Process:** |  |  |
| Tag Name: | xxx-xxx | xxx-xxx |
| Installation DWG. | 13190xx | 13190xx |
| Gas: | H2S | CO |
| Temp min/max: | -40 to 90 º C | -40 to 90 º C |
| Humidity: | 0 - 100% | 0 - 100% |
| Class/Div/Grp: | Class 1 Division 1 Group D | Class 1 Division 1 Group D |
| **Device Data:** |  |  |
| Model: | Explosion Proof with Display | Explosion Proof with Display |
| Gas Code: | Hydrogen Sulfide 0-100 ppm | Carbon Monoxide 1-100 ppm |
| Configuration: | CSA Approval w/NPT Threads | CSA Approval w/NPT Threads |
| Sensor Output: | 3 Wire mA Output | 3 Wire mA Output |
| Sensor Mounting Style: | Sensor Mounted on Remote Housing | Sensor Mounted on Control Unit |
| Relays and LEDs: | Relays and LEDs | Relays and LEDs |
| Display Language/Features: | English | English |
| Optional Power Supply: | None | None |
| Gas Sample Selection: | None – Standard Diffusion Method | None – Standard Diffusion Method |
| Integrated Accessories | None | None |
| Installation Hardware: | Brackets | Brackets |
| Manuals: | Standard | Standard |
| Custom Features: | None | None |
| Manufacturer: | MSA |  |
| Part Number: | A-ULTIMAX-XP-E-17-C-3-D-2-0-0-0-0-1-0-0 | A-ULTIMAX-XP-E-11-C-3-S-2-0-0-0-0-1-0-0 |
| **Sample Pump:** |  |  |
| Manufacturer: | MSA | MSA |
| Part Number: | 10043264 | 10043264 |
| Tubing: | 600771 | 600771 |
| In-Line Filter | 10051406 | 10051406 |

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| --- | --- | --- |
| **Service:** | Infrared Gas Detection | Catalytic Bead |
| **Process:** |  |  |
| Tag Name: | xxx-xxx | xxx-xxx |
| Installation DWG. | 13190xx | 13190xx |
| Gas: | CH4 | O2 |
| Temp min/max: | -40 to 90 º C | -40 to 90 º C |
| Humidity: | 0 - 100% | 0 - 100% |
| Class/Div/Grp: | Class 1 Division 1 Group D | Class 1 Division 1 Group D |
| **Device Data:** |  |  |
| Model: | Explosion Proof with Display | Explosion Proof with Display |
| Gas Code: | IR Combustible 0-100% LEL – Methane 520 | Oxygen 0-25% |
| Configuration: | CSA Approval w/NPT Threads | CSA Approval w/NPT Threads |
| Sensor Output: | 3 Wire mA Output | 3 Wire mA Output |
| Sensor Mounting Style: | Sensor Mounted on Remote Housing | Sensor Mounted on Control Unit |
| Relays and LEDs: | Relays and LEDs | Relays and LEDs |
| Display Language/Features: | English | English |
| Optional Power Supply: | None | None |
| Gas Sample Selection: | None – Standard Diffusion Method | None – Standard Diffusion Method |
| Integrated Accessories | None | None |
| Installation Hardware: | Brackets | Brackets |
| Manuals: | Standard | Standard |
| Custom Features: | None | None |
| Manufacturer: | MSA |  |
| Part Number: | A-ULTIMAX-XP-E-38-C-3-D-2-0-0-0-0-1-0-0 | A-ULTIMAX-XP-E-14-C-3-S-2-0-0-0-0-1-0-0 |
| **Sample Pump:** |  |  |
| Manufacturer: | MSA | MSA |
| Part Number: | 10043264 | 10043264 |
| Tubing: | 600771 | 600771 |
| In-Line Filter | 10051406 | 10051406 |

Second Named Manufacturer:

|  |  |
| --- | --- |
| **Service:** | Catalytic Bead |
| **Process:** |  |
| Tag Name: | xxx-xxx |
| Installation DWG. | 13190xx |
| Gas: | CO |
| Temp min/max: | -40 to 90 º C |
| Humidity: | 0 - 100% |
| Class/Div/Grp: | Class 1 Division 1 Group D |
| **Device Data:** |  |
| Sensor Type: | 6V Poison Resistant |
| Sensor Connection: | 6V (Gold Bell) Senaor Integral With Transmitter |
| Power: | 24VDC |
| Transmitter Output: | 4-20 mA Non-Isolated & Relays |
| Manufacturer: | Scott Instruments |
| Part Number: | 488-1-1-2-4 |

**END OF SECTION**