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| Version | Date | Description of Revisions |
| 1 | November 1, 2011 | Standard Specification Release |
| 2 | April 20, 2015 | General formatting |
| 3 | November 27, 2019 | Removed 1.3.2 (BM) |
| 4 | June 13, 2022 | 1.5 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, bubbler level analyzer, 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 13260 – Bubbler Level System as indicated in the Bid Form.

## Related Sections

### Refer to the following specifications:

#### Section 13310 Panel Specifications

#### Section 13140 Differential Pressure

#### Section 13150 Pressure Switch

#### Section 13200 Gauge Pressure Transmitter

#### Section 16 in its entirety for Electrical Requirements.

## Performance

|  |  |
| --- | --- |
| Specification | Value |
| Accuracy | +/- 0.2 % of range |
| Level Range | 0 to 20 meters |
| Sensitivity | 0.02% of span |
| Repeatability | 0.1% of span |
| Operating Temp | -20 to 50 °C |
| Power | 120 Vac / 60 Hz |

## Bubbler Panel

### Fully functional bubbler panel to be provided and constructed as specified in this specification and accompanying drawings.

### Level measurement utilizing one or two bubble tubes.

### 1/4” stainless steel tubing and stainless connectors to be utilized for all air and sample lines.

### Air grill and filter to be provided. Ten (10) spare air filters to be provided.

### NEMA 4 panel to be provided for indoor applications. NEMA4X panel to be provided for outdoor applications. Refer to Section 13310 Panel Specifications for requirements.

### Local-Off-Remote selector switches to be provided for each bubbler air compressor system.

### Momentary start PBs to be provided for local blow down operation.

### Provide one (1) isolated 4-20 mA @ 600Ω output for each pressure transmitter.

### Provide low pressure switch alarm inputs to PAC.

### Power OK alarm inputs to PAC for each bubbler air system.

### Separate PAC outputs to be provided for control of solenoid valves for each bubbler air compressor system.

### Equipment tag wired to bubbler panel in accordance with Section 01080 – Process Equipment Location Tagging.

### Bubbler panel to be integrated into station PAC for monitoring and control.

### Bubbler panel to be panel FAT tested to prove functionality prior to shipment. Contractor is responsible for setting up appropriate test bed to fully test/verify panel functionality. Consultant and Region PCS to witness and sign off as a minimum

# 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.

#### Panel construction is to follow Section 13310 Panel Specifications and Section 16 for electrical requirements.

#### Instruments are to be mounted and calibrated as per the individual instruments specifications.

#### Pressure transmitters are to be mounted such that display is easily readable through control panel window.

#### Bubbler unit is to be mounted at 1.8m off the floor in a readily accessible location for ease of reading and to facilitate maintenance and calibration.

#### System Integrator is responsible for all PAC and SCADA programming for bubbler panel.

#### Bubble tubes are to be located in an area representative of liquid and where liquid agitation is at a minimum.

#### Bubble tube assembly must be rigidly fixed in position using stainless steel clamps and hardware.

#### Bottom of bubble tubes are to be notched to allow air to come out in a steady stream as opposed to an intermittent stream of bubbles which could introduce errors.

#### Condition of air must be compatible with process liquid.

#### Differential pressure regulator to be utilized to limit use of air.

#### Instrument calibration to the desired range is to be completed before putting bubbler panel into operation.

## Operation

### The following describes in general terms the operation of the Bubbler Level System. All PAC, OIT and SCADA programming is to utilize the Region’s standard programing modules and latest tagging standard.

### Bubbler Device Screen:

#### Allows for control of the individual air systems.

#### Allows for entering/modifying of Auto Blow Down setpoints.

#### Displays, in hours, when the last blow down was completed for each air system.

#### Display wetwell levels prior to blow down and after blow down is completed.

### Local Blow Down:

#### Local blow down can be performed by placing the corresponding System Local-Off-Remote switch in Local. Blow down is initiated by pushing and holding the “System X Local Blow Down” pushbutton.

#### An alarm is generated though the SCADA system whenever an Air System is not in Remote mode.

### Remote Manual Blow Down:

#### The corresponding System Local-Off-Remote switch is placed in Remote. The corresponding System is then placed in Remote Manual via the device pop-up through the OIT or SCADA system.

#### The Operator then selects “Start Blow Down” for the device pop-up.

#### A confirmation pop-up is displayed. The Operator can select “Confirm:” or “Cancel”. Selecting “Cancel” aborts the blow down.

#### After selecting “Confirm”, the PAC initiates a blow down. Blow down continues until the Operator selects “Stop Blow Down” from the device pop-up or upon expiry of a 120s Remote Manual blow down timer.

### Remote Auto Blow Down:

#### The corresponding System Local-Off-Remote switch is placed in Remote. The corresponding System is then placed in Remote Auto via the device pop-up through the OIT or SCADA system.

#### The Operator enters/adjusts the Auto Blow Down operational parameters (for each system):

##### Auto Blow Down Cycle Interval: This is the time cycle in which blow downs occur. Adjustable from 1 hour to 720 hours. Default value: 360 hours.

##### Blow Time of Day: This is the time of day at which the blow down is to occur. Adjustable from 07:30 to 16:00. Default value: 11:00.

##### Blow Down Duration: This is the time duration of the blow down, adjustable from 5 s to 120s. Default value: 20s.

##### Post Blow Down Duration: This is the time duration to allow the bubbler system to recover following an Auto Blow down, adjustable from 15s – 40s. Default value: 20s.

##### Prior to an Auto Blow Down being initiated, if multiple wetwells are at the facility, the PAC confirms that all wetwells are on-line and functioning. If not, an alarm is generated and the auto blow down is aborted.

##### The PAC confirms that the wetwell to be blown down is not currently selected as he controlling wetwell. If not, an alarm is generated and the auto blow down is aborted.

##### The PAC freezes the wetwell level of the wetwell being blown down. Blow down is initiated and continues until the Blow Down Duration period has expired.

##### The PAC continues to hold the wetwell level until the Post Blow Down Duration time has expired.

##### Following completion of the Auto Blow Down, if the difference between the wetwell level after bow down and the wetwell level prior to blow down exceeds the Blow Down Level Differential, an alarm is generated at SCADA. Subsequent Auto Blow Downs for the wetwell is inhibited until the alarm is acknowledged at site on the bubbler panel.

# 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. Refer to bill of materials on drawings

|  |  |  |
| --- | --- | --- |
| Description | Manufacturer | P/N |
| Air compressor with pressure switch | Gast | 08P-21F8619 |
| Air tank | Wainbee | 19840 |
| Pressure regulator c/w gauge | Swagelok / Axess | R07-200-RGEA |
| Constant Differential Relay | Siemens | 62VNA |
| 0-2.14mWc Gauge Pressure Transmitter | E+H | PMC71-UAC1F6RAAAA |
| 3 way solenoid valve | Asco | 8320G200 |
| Pressure Switch | Ashcroft | 8424B |
| Solenoid valve | Asco | 8262G262 |

## Bubbler Level Analyzer

|  |  |  |  |
| --- | --- | --- | --- |
| **Service:** | Tank/Vessel or Surface |  |  |
| **Process:** |  |  |  |
| Tag Name: | xxx-xxx |  |  |
| Installation DWG.: | 13260 |  |  |
| Fluid: | Raw Water |  |  |
| Temp min/max: | 0 to 25 °C |  |  |
| Depth: | 20 Meters Max. |  |  |
| **Functionality:** |  |  |  |
| Type: | Hydrostatic Pressure |  |  |
| Bubble Tube Length: | As required |  |  |
| Analog Output: | 4 - 20 mA DC isolated (600 W) |  |  |
| Power Supply: | 24 Vdc, 2 wire |  |  |
| Enclosure: | Wall Mounted NEMA 4X |  |  |
| Indication: | Backlit LCD Profile & Digital Display |  |  |
| Calibration: | Automatic |  |  |
| Accuracy: | ± 0.1% of range |  |  |
| Options: |  |  |  |
| **Electrical:** |  |  |  |
| Approval: | CSA |  |  |
| Class/Div/Group: | N/A |  |  |

**END OF SECTION**