

Section 15130

PRESSURE GAUGES, TRANSMITTERS AND ELEMENTS

PART 1 GENERAL

1.01 SUMMARY

This Section includes the furnishing and subsequent installation of pressure gauges and pressure level transmitters as shown on Plans and specified herein.

1.02 MEASUREMENT AND PAYMENT

No separate payment for Work performed under this Section. Include cost of same in Contract price bid for Work of which this is a component part.

1.03 REFERENCES (NOT USED)

1.04 SUBMITTALS

Submit the following in accordance with Section 01330 – “Submittal Procedures.”

- A. Shop Drawings are required only when specified manufacturer, type, and/or features are/is deviated from. Shop Drawings, when required, are to include catalog data cut sheet showing manufacturer and highlighted with the exact model number.
- B. Operation and Maintenance Manual to be provided in accordance with Section 01782 - “Operations and Maintenance Data”

1.05 RELATED REQUIREMENTS

- A. Plans and Specification Sections show and/or specify those features required to describe and illustrate functional requirements for providing, testing, and installing pressure gauge, pressure level transmitters and appurtenances.
- B. All materials, supplies, labor, and supervision to be provided as required for a complete and workable system in coordination with available pressures and in accordance with manufacturer’s recommendations.
- C. Section 01330 - “Submittal Procedures”
- D. Section 01782 - “Operations and Maintenance Data”
- E. Section 13346 - " Primary Instrument Devices"
- F. Section 16473 - "Water Receiving Facilities (WRF) Programmable Logic Controllers (PLC), SCADA Interface Panels and Panel Mounted Equipment"

1.06 QUALITY ASSURANCE

- A. All products of a given type are to be furnished by a single manufacturer.
- B. All products to provide satisfactory operation and to require minimal maintenance under the following environmental conditions:
 - 1. Temperature: 0°F to 140°F
 - 2. Relative Humidity: 100 percent

1.07-1.13 (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURER(S)

Subject to compliance with the Contract Documents, the manufacturers listed in the following paragraphs describing the elements are acceptable

2.02 MATERIALS AND/OR EQUIPMENT

A. General

Gauge and gauge seal materials to be equal to or better than the process piping materials of construction.

B. Pressure Level Transmitter

Provide pressure compensator for elevated tank applications. See Section 13346 - "Primary Instrument Devices" for more information on field devices. See "Pressure Gauge, Transmitters and Elements Schedule" in "ATTACHMENT" for type of transmitter(s) being installed.

- 1. Acceptable manufacturers:
 - a. Rosemount, Model 3051
 - b. Siemens - Sitrans P500 series
 - c. Endress-Hauser, Cerabar M
 - d. Or Approved Equal
- 2. Materials
 - a. Process-wetted parts 316 stainless steel
 - b. Process connection: ½ in. NPT

- c. 316L stainless steel process diaphragm
 - d. Utilize manufactures standard liquid fill
 - e. Housing stainless steel
 - f. Include two valve manifold for testing/vent/drain
 - g. Include isolating diaphragm if designated in “ATTACHMENT”
3. Fabrication/Design:
- a. Output:
4-20 mA DC proportional to pressure
 - b. Power supply: 24 volts DC
 - c. Adjustable zero and span
 - d. Temperature limits:
-20 to 180°F, -4 to 175°F for LCD indicators
 - e. Overpressure limits:
Withstand 150 percent of stated maximum service pressure without damage
 - f. Humidity limits: 0 to 100 percent relative humidity
 - g. Damping: Adjustable between 0 and 32 seconds
 - h. Inaccuracy (includes effects of linearity, repeatability and hysteresis):
+/- 0.10 percent of calibrated span for 15:1 rangeability
 - i. Stability: +/- 0.2 percent of upper range limit for 12 months
 - j. Total temperature effect including span and zero errors: +/-0.2 percent of upper range limit per 100°F for minimum 15:1 rangeability
 - k. Include connections for ground storage tank levels to be able to be transmitted to SCADA System. See Section 16473 - "Water Receiving Facilities (WRF) Programmable Logic Controllers (PLC), SCADA Interface Panels and Panel Mounted Equipment" for more information on the interface between the pressure level transmitter and the SCADA system.

C. Pressure Gauge

1. See "Pressure Gauge, Transmitters and Elements Schedule" in "ATTACHMENT" for type of pressure gauge(s) being installed.
2. Acceptable manufacturers
 - a. Ashcroft
 - b. Ametek
 - c. Or Approved Equal
3. Materials
 - a. Bourdon tube, socket, connecting tube: 316 stainless steel
 - b. Glycerine-filled
 - c. 316 stainless steel bourdon tube
 - d. Phenolic or stainless steel case and ring, 4 1/2" diameter for pipes greater than 1 1/2 in. and 2 1/2 in. for pipes less than or equal to 1 1/2 in.
 - e. Stainless steel movement components
 - f. Heat-resistant acrylic window
 - g. White dial with black markings
 - h. 1/2-inch NPT 316 stainless steel stem connection for pipes greater than 1 1/2 in., and 1/4 in. for pipes less than or equal to 1 1/2 in.
 - i. Overload stop high-pressure protection
 - j. Pressure range on "ATTACHMENT"
 - k. Accessory: Diaphragm seal when called out on Plans
 - (1) 316 stainless steel wetted parts
 - (2) Zinc-plated carbon steel top
 - (3) Silicone-filled
 - (4) Factory-installed and provided as a gauge and seal assembly ready for field installation as a complete unit

4. Fabrication
 - a. Include isolation valve between pressure source and gauge
 - b. Provide viewer protection from element rupture
 - c. Calibrate gauges at jobsite for pressure and temperature in accordance with manufacturer's instructions
 - d. All components suitable for service at 250°F or the maximum process temperature to which the gauge is to be exposed.
 - e. Gauge tapping position to be clear of equipment functions and movements, and protected from maintenance and operation of equipment
 - f. Gauge to be readable from an accessible standing position
 - g. Gauge accuracy: +/- 0.5 percent of full range
 - h. Select gauge range so that:
 - (1) The normal operating value is in the middle third of the dial
 - (2) Maximum operating pressure does not exceed 75 percent of the full scale range

D. Diaphragm Seal

1. See "Pressure Gauge, Transmitters and Elements Schedule" in "ATTACHMENT" for type of diaphragm seal(s) being installed.
2. Acceptable manufactures
 - a. Ashcroft
 - b. Ametek
 - c. Rosemount
 - d. Endress-Hauser
 - e. Or Approved Equal
3. Materials
 - a. Housing: 316 stainless steel
 - b. Diaphragm: 316 stainless steel

- c. Use manufactures standard fluid fill unless otherwise noted on “ATTACHMENT”
- d. Process connections
 - (1) Process: ½ in. NPT
 - (2) Instrument: ½ in. NPT

2.03 SOURCE QUALITY CONTROL

Each device to be factory tested over its full operating range.

PART 3 EXECUTION

3.01 GENERAL / MANUFACTURER(S)

Instruments and appurtenances to be installed in accordance with Plans, approved shop drawing when required, and manufacturer’s recommended installation instructions.

3.02 INSTALLATION

- A. Installation to occur after major piping is installed and tested.
- B. Install products in accordance with manufacturer's instructions.
- C. Install instrument mounting pipe stands level and plumb.
- D. Instrument Valves:
 - 1. Orient stems for proper operation
 - 2. Install arrays orderly and neat in appearance with true horizontal and vertical lines
 - 3. Provide a minimum of 2 inch clearance between valve handle turning radii where there are multiple valve handles appearing in a straight line.
 - 4. Valves shall have bonnets and any soft seals removed during welding or soldering into the line.
 - a. When cool, reassemble the valves
 - 5. Support each valve individually.
 - a. The tubing system does not qualify as support for the valve
- E. Locate instrument piping and tubing so as to be free of vibration and interference with other piping, conduit, or equipment.

- F. Keep foreign matter out of the system
- G. Remove all oil on piping and tubing with solvent before piping and tubing installation.
- H. Plug all open ends and connections to keep out contaminants
- I. Threaded Connection Seals:
 - 1. Use Tite-Seal or acceptable alternate.
 - 2. Use of lead base pipe dope or Teflon tape is not acceptable
 - 3. Do not apply Tite-Seal to tubing threads of compression fittings

3.03 FIELD QUALITY CONTROL

Field Calibration:

Gauges are to be calibrated at 10, 50, and 90 percent of span using test instruments to simulate inputs. Outputs to be read that are rated to an accuracy that is at least five times greater than the specified accuracy. Such test instruments to have accuracies traceable to the National Bureau of Standards.

3.04-3.10 (NOT USED)

ATTACHMENT

[Design Engineer is to complete blanks per site requirements]

A. Plans/Details

1. Drawing(s): _____
2. Detail Number(s): _____
3. Electrical Wiring Drawing(s): _____
4. Electrical Wiring Detail(s): _____

PRESSURE GAUGE, TRANSMITTERS AND ELEMENTS SCHEDULE			
Tag Number*	Pressure Range	Diaphragm Seal (Y/N)	Case

* Tag number is the number identified with pressure gauge, transmitter or diaphragm seal on Plans.

END OF SECTION