PROCESS/ON-LINE

ON-LINE ABSOLUTE VAPOR PRESSURE MONITOR

41351 & 41352 NEC Class 1 Div 1 Group D
41355 CENELEC Zone 1 Group IIA


41351

Measure absolute vapor pressure of hydrocarbon products… continuously & completely on-line!

PSPI's Absolute Vapor Pressure Monitor provides consistent, accurate readings by *continuously* measuring vapor pressure of sample at a uniform, pre-selected nozzle pressure and a constant temperature.

- Measures Absolute Vapor Pressure from 0 to 200 psi with preset temperature range of 37.8º to 71ºC (100º–160ºF)
- Results directly correlate to
  – ASTM D 323 (IP 69 & ISO 3007)
  – ASTM D 1267 (IP 161 & ISO 4256)
- No sample recovery system required for return pressures up to 9.1 kg/cm^2 (130 psig) maximum
- Economical, simple to operate and requires little, if any, training to implement and maintain
- Low cost of ownership
- Laboratory accuracy with on-line convenience; *continuous* absolute viscosity results
- Fast response ideal for closed loop control implementation in an automatic or in-line blending system
- Typical applications include crude oils, gasoline blending, aviation fuels, kerosene, naphtha to propanes/ butanes, LPG and saturated gases

THEORY OF OPERATION

Sample enters the instrument's bath through a pressure regulator. It continues through a parallel-path heat exchanger, a nozzle assembly, then out of the monitor through a second pressure regulator for return to process or suitable drain, depending on existing pressure conditions. Bath temperature setpoint is normally 37.8°C (100°F); however, the temperature setpoint may be any value between 37.8° and 71°C (100°–160°F) and is maintained within ± 0.05°C (± 0.9°F) of setpoint by the temperature controller. A stainless steel cooling coil provides constant circulation of cooling water while two hollow-blade impellers ensure complete mixing of the bath medium.

The principle component of the Absolute Vapor Pressure Monitor is its jet pump (also known as an eductor, aspirator, or ejector). Suction pressure at the throat of the ejector is limited by, or cavitates at, the absolute vapor pressure of the fluid being pumped. To operate properly as a cavitating jet pump, the ejector supply and back pressures must be carefully controlled to predetermined values based primarily on fluid viscosity and sample type. The ejector suction port is dead-ended and operates at zero pumping rate. Absolute pressure is governed by fluid vapor pressure as long as nozzle supply pressure (relative to nozzle back pressure) and nozzle position (relative to ejector throat) are correct. Nozzle position is readily adjustable. Insertion of adjusting shims modifies the distance between the vapor pressure. This procedure permits alteration of output readings to correlate with Reid Vapor Pressure test values, if desired. The vapor chamber of the ejector is connected to the pressure transmitter, which produces an output signal proportional to the measured variable.

ABSOLUTE VAPOR PRESSURE MONITOR

PRECISION
SCIENTIFIC PETROLEUM INSTRUMENTS

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SPECIFICATIONS

Performance

- **Measurement Range**: 0–1.4 to 0–14 kg/cm² absolute (0–20 to 0–200 PSIA)
- **Response Time**: ~1 minute or less to respond to product change
- **Repeatability**: Equal to or better than ASTM D 323 or D 1267
- **Linearity**: 0.5% of span
- **Dead Time**: 25 seconds, nominal
- **Ambient Condition**: 4° to 60°C (40°–140°F); weather protection required; no direct sunlight

Sample Requirements

- **Fast Loop Flow Rate**: Sample flow velocity 0.6 to 1.5 m/sec (2–5'/sec)
- **Analyzer Flow Rate**: 38 to 190 ltr/hr (10–50 gal/hr)
- **Sample Pressure**: 5.3 kg/cm² (75 psig) min; 35 kg/cm² (500 psig) max; varies with application, consult PSPI
- **Sample Return Pressure**: 9.1 kg/cm² (130 psig) maximum
- **Sample Inlet Temperature**: 21.1° to 49°C (70°–120°F)
- **Viscosity**: 50 cP maximum, at bath temperature

Utility Requirements

- **Electrical**:
  - *MODEL 41351*: 115VAC (±10%), 50/60 Hz, single phase, 2000 watts
  - *MODEL 41352*: 230VAC (±10%), 50/60 Hz, single phase, 2000 watts
  - *MODEL 41355*: 230VAC (±10%), 50/60 Hz, single phase, 2000 watts
  - *MODEL 41355-1*: 115VAC (±10%), 50/60 Hz, single phase, 2000 watts
- **Cooling Water**:
  - *FLOW:* 2 liters/minute (½ gallon/minute) maximum
  - *TEMPERATURE:* 4.4° to 32.2°C (40°–90°F)
  - *INLET PRESSURE:* 7 kg/cm² (100 psig) maximum
  - *DIFFERENTIAL PRESSURE:* 1.9 kg/cm² (25 psig) minimum
- **Oil Bath**: 9.5 liters (2.6 gal) Inhibited Transformer Oil (PSPI# JY-400000)

Signal Outputs

- **Analog Outputs**: One isolated 4-20 mAdc (standard)
- **Local Display**: Digital LCD (standard)

Area Classification

- **41351 & 41352**: NEC Class 1, Div 1, Group D components
- **41355 & 41355-1**: CENELEC Zone 1, Group IIA components; compliant

Uncrated:	**H**	**W**	**D**	**units**
182 kg (400 lbs)	1391	406	889	mm
	54 3/4	16	35	inches

Crated:	**H**	**W**	**D**	**units**
250 kg (550 lbs)	1550	508	991	mm
	61	20	39	inches

Optional Accessories

- **Filter Coalescer** separates water from petroleum liquids and acts as high-efficiency filter
- **Sample Conditioning System** prepares and presents representative sample to analyzer with minimum lag time

Due to PSPI's commitment to continual product development, specifications are subject to change without notice.

For more information, please contact us:

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